Rydus, N. M.

RYDUS, N.M.

Vladivostok School of Pharmacy. Apt.delo 6 no.6:41-42 N-D '57.
(MIRA 10:12)
1. Direktor Vladivostokskogo farmatsevticheskogo uchilishcha.
(VLADIVOSTOK--PHARMACY--STUDY AND TEACHING)

EYDUS, N.M.

Eliminate shortcomings in training subordinate pharmaceutical peronnel. Apt.delo 7 no.3:37 My-Je '58 (MIRA 11:7)

1. Iz Vladivostokskogo farmatsevticheskogo uchilishcha.
(PHARMACY--STUDY AND TEACHING)

EYDUS, YA. [Eiduss, J.]; MUTSE"IETSE, L. [Muceniece, L.]

Ultraviolet absorbtion spectra of nitrofurans. Vestis Latv ak no.11:65-82 '61.

EYDUS, Ya. [Eiduss, J.]

Prominent physicist August Toepler of the 19th century and his work in Riga. Izv.AN Latv.SSR no.2:128-130 '63. (MIRA 16:4)
(Toepler, August Joseph Ignaz, 1836-1912)

ACC NR: AP7009580 SOURCE CODE: UR/0259/66/000/011/0005/0008

AUTHOR: Eydus, Ya. (Candidate of physico-mathematical sciences)
ORG: none
TITLE: Beams of light carrying information
SOURCE: Nauka i tekhnika, no. 11, 1966, 5-8
TOPIC TAGS: laser communication, laser beam
SUB CODE: 17,20

ABSTRACT: The ever-expanding need for exchange of information has crowded the radio frequency spectrum. A qualitatively new solution to the problem of channel capacity is offered by the recently created sources of monochromatic coherent light. These so-called masers and lasers operate at extremely high frequencies, and, since the quantity of information theoretically able to be transmitted on a communcations channel is directly proportional to the frequency, their theoretical information capacity is tremendous. The capacity of a laser communications channel is at least 1000 times greater than the capacity of all radio channels used up to now, including microwave. This means that if we use 1% of the carrier frequency for message transmission, a laser beam operating at $3 \cdot 10^{14}$ Hz could carry approximately 1 billion telephone conversations or several thousand television channels simultaneously. Due to the coherent nature of the beam and the lack of dissipation, a low power (several dozen watts) laser installation can maintain communications in outer space over ranges of hundreds of millions of kilometers. The primary problem hindering laser communications now is modulation of the laser beam. Theoretically, any of the four standard

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ACC NR: AP7009580

parameters of a laser beam can be modulated to place information on the beam: frequency, amplitude, phase and polarization. Actually, two primary methods can be used to modulate the light beam exiting from a laser: internal and external methods. In the first case, the light beam is acted upon as it is being formed, i.e., within the actual laser. In the second case, the modulation is performed after the beam has been created. Internal methods include re- generation modulation, modulation using the Stark effect and modulation using the Seeman effect. Scientists at present are giving preference to the external modulation methods, which include modulation of the pumping, mechanical modulation, modulation using the Faraday effect, modulation using the Kerr effect and modulation using the optical birefringence effect in pietzoelectric crystals. This last effect, especially strongly appearing in potassium dihydrophosphate and ammonium dihydrophosphate crystals, is currently considered to be the most promising. Orig. art. has: 4 figures. [JPRS: 40,102]

Card 2/2

EYDUS, Ya.A. [Eiduss, J.]; VENTER, K.K.; GILLER, S.A., akademik

Effect of terminal substituents in 5-nitrofurylpolyene derivatives on their electron spectra. Dokl. AN SSSR 141 no.3:655-658 N '61. (MIRA 14:11)

1. Institut organicheskogo sinteza AN Latviyskoy SSR i Latviyskiy gosudarstvennyy universitet im. P. Stuchki.
2. AN Latviyskoy SSR (for Giller).
(Olefins--Spectra)

SILIN'SH, E.A. [Silins, E.]; POPENS, YA.YA. [Popens, J.]; EYDUS, Ya.A. [Edius, J.]

Spectrophotometric and fluorimteric determination of corticosteroid hormones. Izv. AN SSSR.Ser.fiz. 26 no.10:1311-1313 '62. (MIRA 15:10)

1. Latviyskiy gosudarstvennyy universitet im. Petra Stuchki i Respublikanskaya klinicheskaya bol'nitsa im. Paulya Stradynya.
(HORMONES) (SPECTROPHOTOMETRY) (FLUORIMETRY)

S/197/63/000/002/004/005
B117/B186

AUTHORS: Eydus, Ya., Polko, T., Yur'yev, Yu.

TITLE: Vibrational and electronic spectra of certain selenophene homologues

PERIODICAL: Akademiya nauk Latviyskoy SSR. Izvestiya, no. 2 (187), 1963, 63-67

TEXT: Vibrational and electron spectra of trimethyl, tetramethyl, 2-ethyl, 2-propyl and 2-butylselenophene were examined and compared with previously investigated spectra of mono and dialkyl selenophenes. The following particularities were established: The band 3060 cm^{-1}, which corresponds to the C-H vibrations and is intensive in the infrared spectrum of the selenophene, is slightly shifted toward lower frequencies. It is intensive in Raman spectra but, unlike selenophene, it is very weak in infrared spectra. Since the intensive band observed between 2950 and 2960 cm^{-1} is absent from the spectrum of the very symmetric tetramethylselenophene it seems to be characteristic for such selenophenes as are substituted by mono-, di-, and trialkyl. Unlike tri- and

Card 1/2

Vibrational and electronic spectra of ...

tetramethylselenophenes, in whose spectrum the band 2750 cm^{-1} is very weak, it became intensified in the spectra of mono- and dimethylselenophene as the number of methyl groups increased. The bands corresponding to the C≡C vibrations were ascertained in the same region as in the spectra of alkyl derivatives of selenophene previously investigated. The band in the region 700 cm^{-1} is characteristic for the vibrations of the C-Se bonding and likewise agrees with previous results. The band in the region 1380 cm^{-1}, established in all the compounds investigated, may be attributed to deformation vibrations of the C-H bonding. On comparing the vibrational spectra examined with data hitherto available on spectra of alkanes, cyclic and aromatic hydrocarbons it was found that cyclic compounds that are substituted by propyl can be identified from their vibrational spectra with sufficient reliability. In investigating the electron spectra of alkyl selenophenes it was found that they have an absorption maximum in the region 250 mμ but fail to exhibit any other particularity. There are 5 figures and 1 table.

SUBMITTED: September 1, 1962

ACCESSION NR: AP4020955 S/0051/64/016/003/0424/0428

AUTHOR: Bobovich, Ya.S.; Eydus, Ya.A.

TITLE: Quantitative measurements of intensity in the Raman spectra of powdered substances

SOURCE: Optika i spektroskopiya, v.16, no.3, 1964, 424-428

TOPIC TAGS: Raman spectroscopy of solids, powder Raman spectra, naphthalene, furan, nitrofuran, paranitrophenetole, diphenylamine, paranitrotoluene, stilbene, tolan, diphenylacetylene

ABSTRACT: It is difficult or impossible to obtain Raman spectra by the conventional procedure in the case of poorly soluble substances and substances that undergo photochemical reactions in solution. In principle the problem of obtaining the Raman spectra of such substances in powdered form has been solved; the operation involves the use of powerful mercury tubes and a double monochromator (B.A.Kiselev, Opt.i spektr.1,597,1956; S.L.Berkovich et al, Ibid.6,824,1959; Ya.S.Bobovich and V. M.Pivovarov, ZhETF 29,696,1955). In the present article there is described a specific technique for measuring the intensity coefficients of the Raman lines in the

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ACCESSION NR: AP4020955

spectra of fine-crystalline organic powders as well as some applications of the technique. The analyzed substance is mixed with naphthalene and thoroughly ground; the mixture is coated on an oblique cut surface of a wooden cylinder. The exciting radiation is supplied by a helical low-pressure mercury discharge tube and the scattered radiation is viewed, as usual, from the side. The naphthalene serves as the internal standard, i.e., the Raman line intensities are gaged with reference to the intensity of the 1380 cm^{-1} naphthalene line. It is noted that an essential requirement in the case of colored substances is that the exciting radiation must be of appropriate frequency, i.e., must penetrate into the substance + naphthalene layer. The results of test measurements on a number of substances insoluble and soluble are described; among the insoluble substances were some nitrofurans and para-nitrophenetole (the intensity increases in direct proportion to the molar concentration in the mixture with naphthalene). For the soluble substances the intensity values obtained for the powders and for solutions agree in some cases, but differ significantly in others (but the relative values for different substances are consistent). Thus, the proposed technique makes it possible to obtain the Raman spectra of many substances that cannot be worked with in the form of solutions. Orig.art.has: 2 figures and 2 tables.

Card 2/2

L 62302-65 EWT(1)/EWT(m)/EPF(c)/EWP(j)/T/EWA(c) IJP(c) RM 16

ACCESSION NR: AP5019982 UR/0371/65/000/002/0075/0082 15 B

AUTHOR: Eiduss, J. (Eydus, Ya. A); Zuika, I. (Zuyka, I. V.) 21

TITLE: Band intensities in Raman spectra of crystalline powders of 5-nitrofurans and the intramolecular interaction

SOURCE: AN LatSSR. Izvestiya. Seriya fizicheskikh i tekhnicheskikh nauk, no. 2, 1965, 75-82

TOPIC TAGS: Raman spectrum, nitrofuran, conjugated bond system, nitrofuran vinylog

ABSTRACT: The authors obtained Raman spectra and determined the band intensity coefficients for a series of nitrofurans and their vinylogs. A method involving the use of an internal standard (nephthalene) was used. It consisted in thoroughly mixing the substance studied in the form of a crystalline powder with the powdered internal standard in various molar ratios and recording the spectrum with a DFS-12 diffraction spectrometer. It was found that in the crystalline state, certain nitrofurans and their first vinylogs are sufficiently stable when illuminated with the 4360 Å line of mercury, so that the measurements could be carried out. The band intensity of the nitro group in

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L 62302-65

ACCESSION NR: AP5019982

the region of 1350 cm^{-1} is discussed; while the frequency of the nitro group varies little upon the introduction of the vinylidene group into the 2-substituting chain (by no more than 10 cm^{-1}), the intensity varies by a whole order of magnitude and even more (by a factor of 20-40). This increase in the intensity of the vibrational band of the substituent, located in the para position relative to the additional conjugation element introduced, indicates beyond any doubt that the nitro group, ring, and X-substituent are integral parts of a single conjugated electronic system. This may be regarded as sufficient evidence in favor of the interpretation of electronic bands which treats the latter as the result of the first and second electronic transition, and not as transitions of two isolated electronic systems ("separated chromophores"). Orig. art. has: 4 figures and 1 table.

ASSOCIATION: Latviyskiy gosudarstvennyy universitet im. P. Stuchki (Latvian State University)

SUBMITTED: 10Dec64 ENCL: 00 SUB CODE: OC,OP

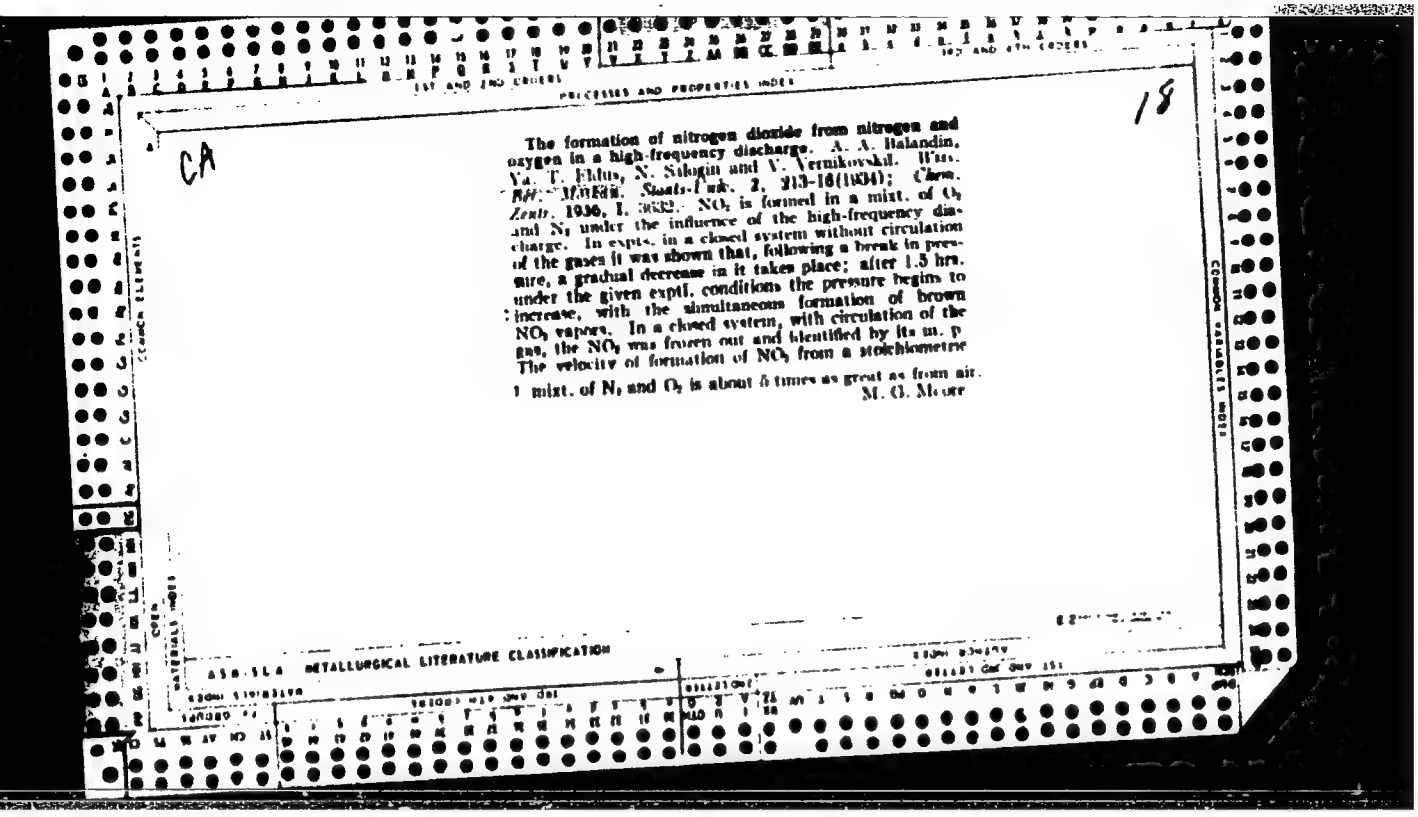
NO REF SOV: 012 OTHER: 000

Card 2/2

CHIPEN, G.I.; EYDUS, Ya.A. [Eidus, J.]; BOBOVICH, Ya.S.; GRINSHTEYN, V.Ya. [Grinsteins, V.]

Structure of N-acyl derivatives of 3-phenyl-5-amino-1,2,4-triazole. Zhur. strukt.khim. 6 no.1:53-57 Ja-F '65. (MIRA 18:12)

1. Institut organicheskogo sinteza AN Latviyskoy SSR; Latviyskiy gosudarstvennyy universitet imeni P.Stuchki i Gosudarstvennyy opticheskiy institut imeni S.I.Vavilova.
Submitted October 10, 1963.

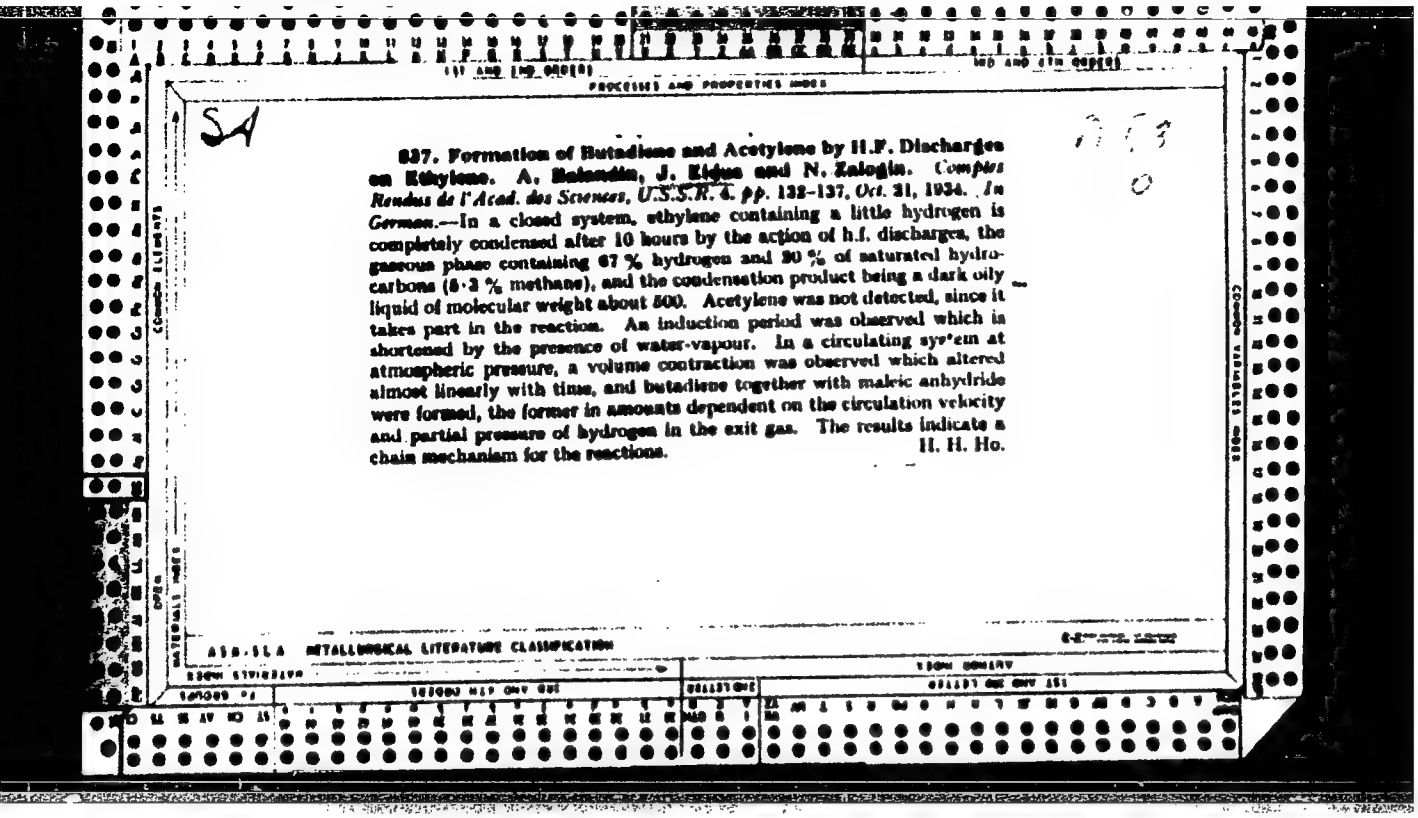


CA

18

The formation of nitrogen dioxide from nitrogen and oxygen in a high-frequency discharge. A. A. Balandin, Ya. T. Eldis, N. Sibagin and V. Vernikovskil. Fiz. Khim. Monitor. Staats-Univ. 2, 213-18(1934); *Chem. Zentr.* 1936, I, 3882. NO_2 is formed in a mixt. of O_2 and N_2 under the influence of the high-frequency discharge. In expts. in a closed system without circulation of the gases it was shown that, following a break in pressure, a gradual decrease in it takes place; after 1.5 hrs. under the given exptl. conditions the pressure begins to increase, with the simultaneous formation of brown NO_2 vapors. In a closed system, with circulation of the gas, the NO_2 was frozen out and identified by its m. p. The velocity of formation of NO_2 from a stoichiometric mixt. of N_2 and O_2 is about 5 times as great as from air.

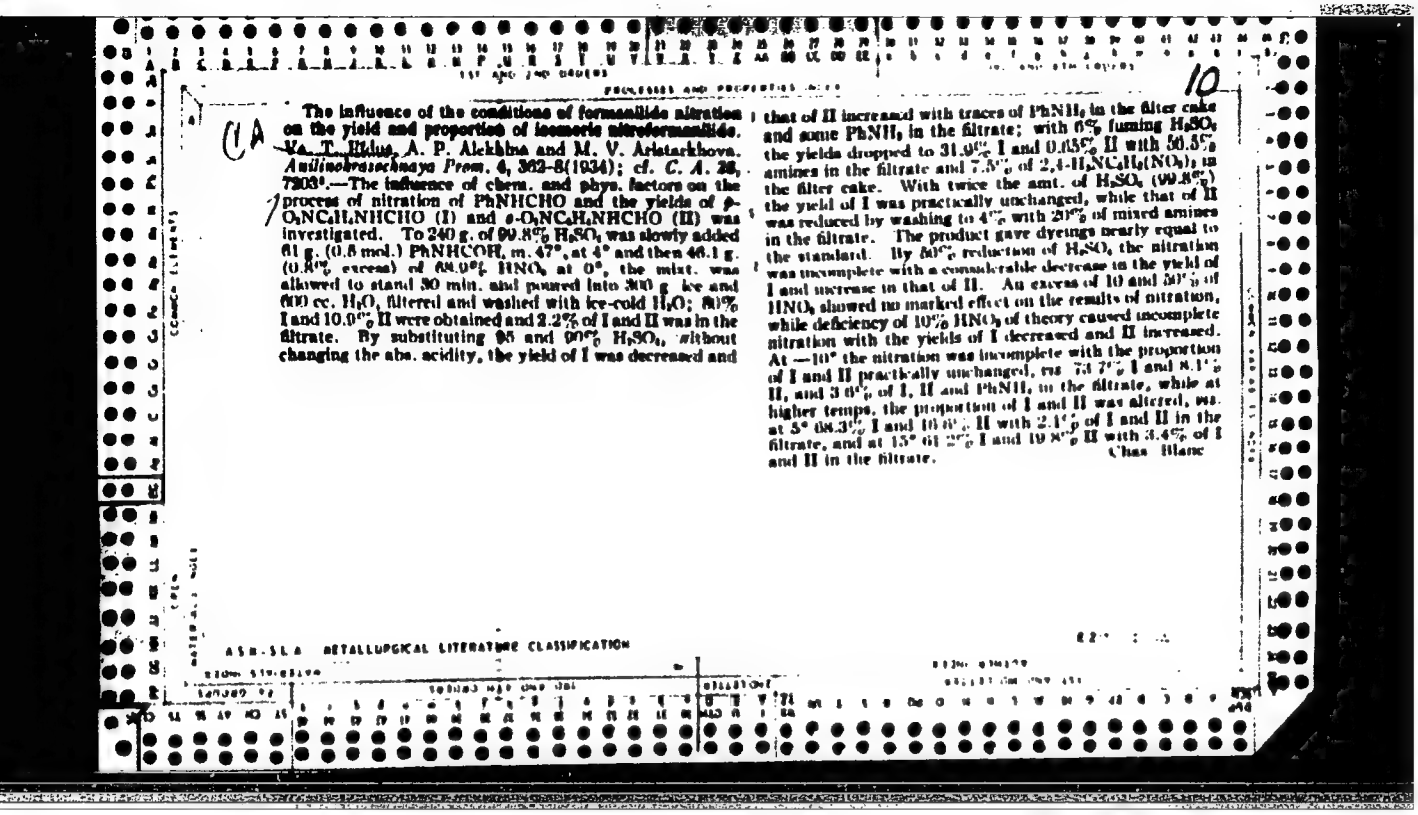
M. G. Moore



SA

837. **Formation of Butadiene and Acetylene by H.F. Discharges on Ethylene.** A. **Balandin, J. Eigus and N. Zalogin.** *Comptes Rendus de l'Acad. des Sciences, U.S.S.R.* 4. *pp.* 132–137, *Oct.* 31, 1934. *In German.*—In a closed system, ethylene containing a little hydrogen is completely condensed after 10 hours by the action of h.f. discharges, the gaseous phase containing 67 % hydrogen and 30 % of saturated hydrocarbons (5·3 % methane), and the condensation product being a dark oily liquid of molecular weight about 500. Acetylene was not detected, since it takes part in the reaction. An induction period was observed which is shortened by the presence of water-vapour. In a circulating system at atmospheric pressure, a volume contraction was observed which altered almost linearly with time, and butadiene together with maleic anhydride were formed, the former in amounts dependent on the circulation velocity and partial pressure of hydrogen in the exit gas. The results indicate a chain mechanism for the reactions.

H. H. Ho.



10

CIA

The influence of the conditions of formanilide nitration on the yield and properties of isomeric nitroformanilides. Va. T. Ilkus, A. P. Alekhina and M. V. Aristarkhova. *Anilinokrasochnaya Prom.* 4, 362–8(1934); cf. *C. A.* 28, 7303°.—The influence of chem. and phys. factors on the process of nitration of PhNHCHO and the yields of *p*-$O_2NC_6H_4NHCHO$ (I) and *o*-$O_2NC_6H_4NHCHO$ (II) was investigated. To 240 g. of 99.8% H_2SO_4 was slowly added 61 g. (0.5 mol.) PhNHCOH, m. 47°, at 4° and then 46.1 g. (0.8% excess) of 68.0% HNO_3 at 0°, the mixt. was allowed to stand 30 min. and poured into 300 g. ice and 600 cc. H_2O, filtered and washed with ice-cold H_2O; 80% I and 10.9% II were obtained and 2.2% of I and II was in the filtrate. By substituting 95 and 90% H_2SO_4, without changing the abs. acidity, the yield of I was decreased and that of II increased with traces of $PhNH_2$ in the filter cake and some $PhNH_2$ in the filtrate; with 6% fuming H_2SO_4 the yields dropped to 31.9% I and 0.05% II with 56.5% amines in the filtrate and 7.5% of 2,4-$H_2NC_6H_3(NO_2)_2$ in the filter cake. With twice the amt. of H_2SO_4 (99.8%) the yield of I was practically unchanged, while that of II was reduced by washing to 4% with 20% of mixed amines in the filtrate. The product gave dyeings nearly equal to the standard. By 50% reduction of H_2SO_4, the nitration was incomplete with a considerable decrease in the yield of I and increase in that of II. An excess of 10 and 50% of HNO_3 showed no marked effect on the results of nitration, while deficiency of 10% HNO_3 of theory caused incomplete nitration with the yields of I decreased and II increased. At −10° the nitration was incomplete with the proportion of I and II practically unchanged, viz. 51.7% I and 8.1% II, and 3.0% of I, II and $PhNH_2$ in the filtrate, while at higher temps. the proportion of I and II was altered, viz. at 5° 68.3% I and 10.0% II with 2.1% of I and II in the filtrate, and at 15° 61.2% I and 19.8% II with 3.4% of I and II in the filtrate.

Chas. Blanc

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

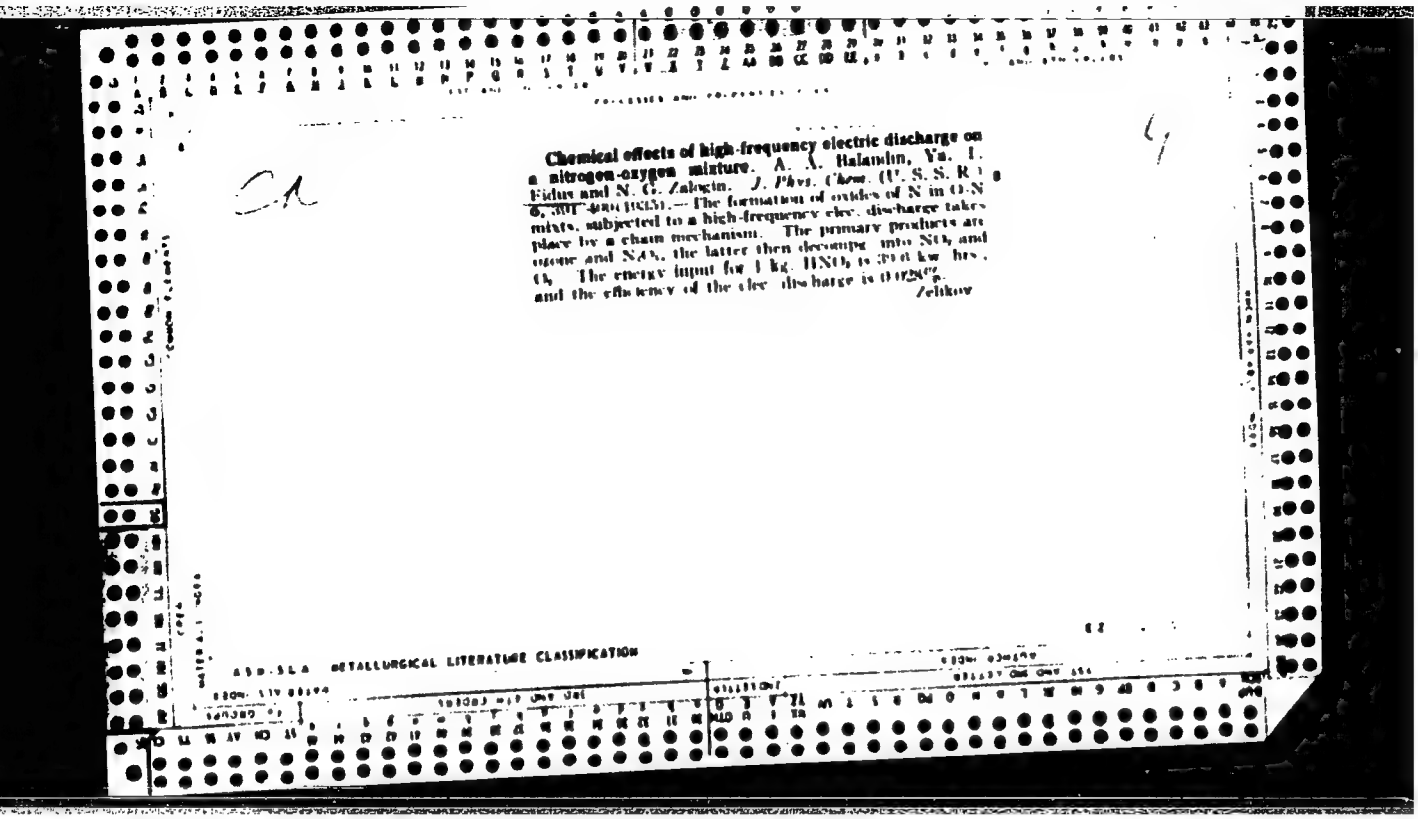
BC

B-II-1

Influence of conditions of nitration of formanilide on the yield and relative isomeric composition of nitroformanilides. [illegible], A. P. Alechina, and M. V. A[illegible]va (Anilinokras. Prom., 1934, 4, 383—388).—The ratio of p- (I) to o- (II) -nitroformanilide rises from 2·5 when [illegible]% H_2SO_4 is used in the nitration mixture to [illegible] with [illegible]% [illegible]; at the same time the total yield falls by > [illegible]%, partly owing to formation of [illegible]. The best yield ([illegible]%) is obtained when [illegible]% H_2SO_4 is used. Increasing the proportion but not the concn. of H_2SO_4 does not affect the yield of (I), but greatly reduces that of (II) in the paste; the reverse is the case when the proportion of H_2SO_4 is < the optimum. The total yield and its composition are little affected by increasing the proportion of HNO_3 by up to [illegible]0%. The best yields of (I) are obtained by nitration at 0°. The proportion of (II) in the product rises from 8·7% at −10° to [illegible]% at 15°.

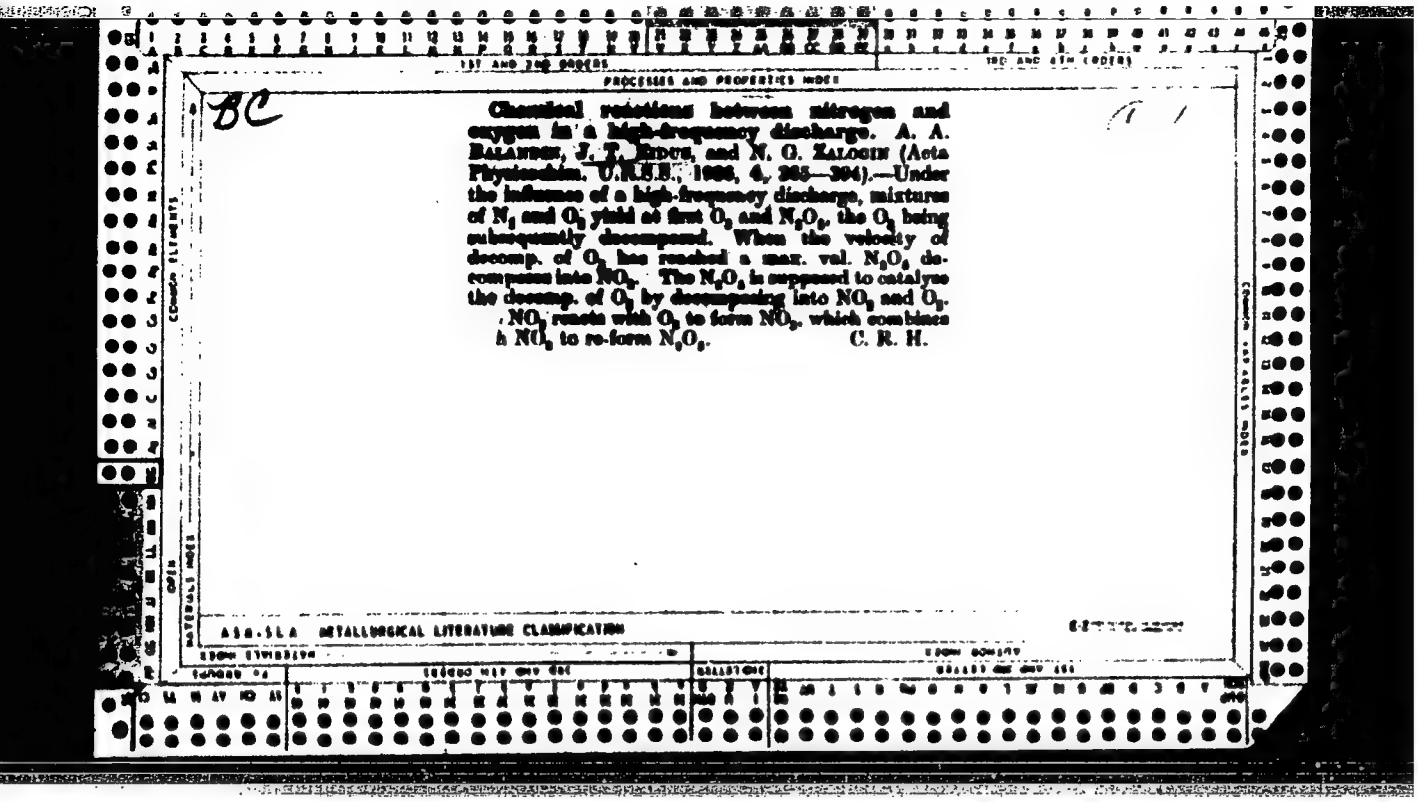
R. T.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



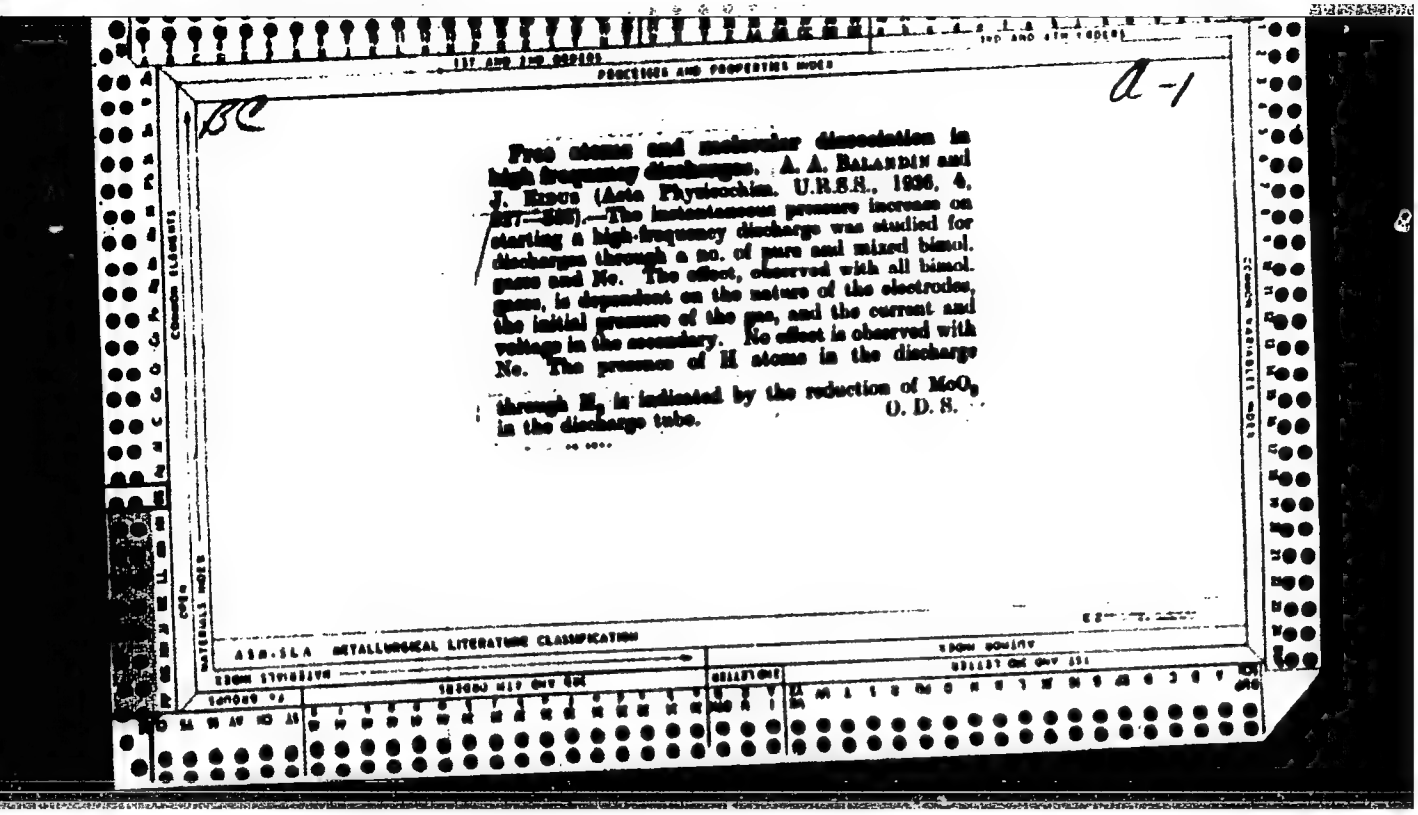
Chemical effects of high-frequency electric discharge on a nitrogen-oxygen mixture. A. A. Balandin, Ya. I. Fidus and N. G. Zalogin. *J. Phys. Chem. (U. S. S. R.)* 6, 307–9(1935).—The formation of oxides of N in O-N mixts. subjected to a high-frequency elec. discharge takes place by a chain mechanism. The primary products are ozone and N_2O_5, the latter then decomps. into NO_2 and O_2. The energy input for 1 kg. HNO_3 is 200 kw. hrs. and the efficiency of the elec. discharge is 0.02%.
Zelikow

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION



BC

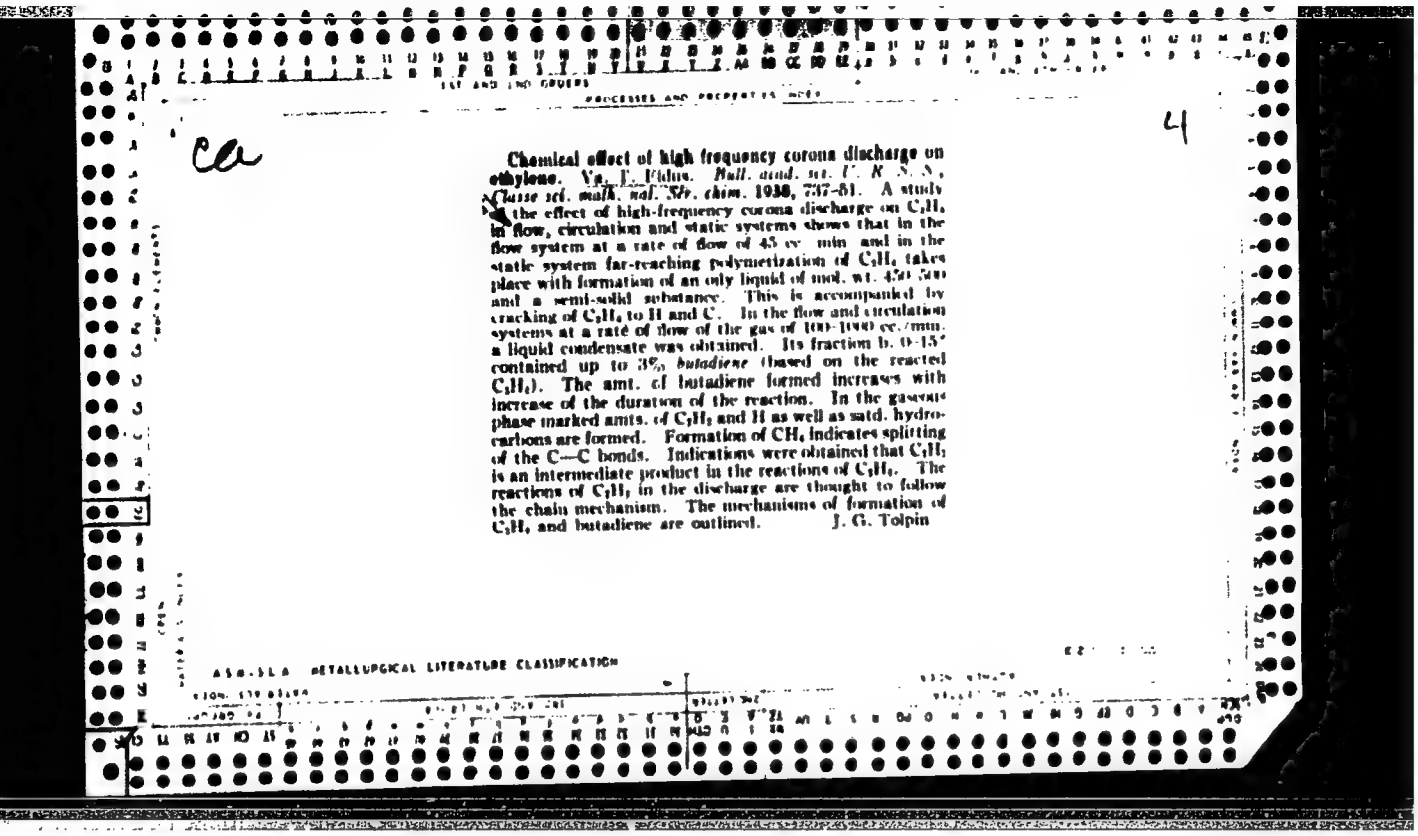
Chemical reactions between nitrogen and oxygen in a high-frequency discharge. A. A. Balandin, J. P. Erdos, and N. O. Zalogin (Acta Physicochim. U.R.S.S., 1936, 4, 285—304).—Under the influence of a high-frequency discharge, mixtures of N_2 and O_2 yield at first O_3 and N_2O_5, the O_3 being subsequently decomposed. When the velocity of decomp. of O_3 has reached a max. val. N_2O_5 decomposes into NO_3. The N_2O_5 is supposed to catalyse the decomp. of O_3 by decomposing into NO_3 and O_2. NO_3 reacts with O_3 to form NO_2, which combines h NO_3 to re-form N_2O_5. C. R. H.



BC

a-1

Free atoms and molecular dissociation in high frequency discharges. A. A. Balandin and J. Enous (Acta Physicochim. U.R.S.S., 1936, 4, 237—248).—The instantaneous pressure increase on starting a high-frequency discharge was studied for discharges through a no. of pure and mixed bimol. gases and Ne. The effect, observed with all bimol. gases, is dependent on the nature of the electrodes, the initial pressure of the gas, and the current and voltage in the secondary. No effect is observed with Ne. The presence of H atoms in the discharge through H_2 is indicated by the reduction of MoO_3 in the discharge tube. O. D. S.

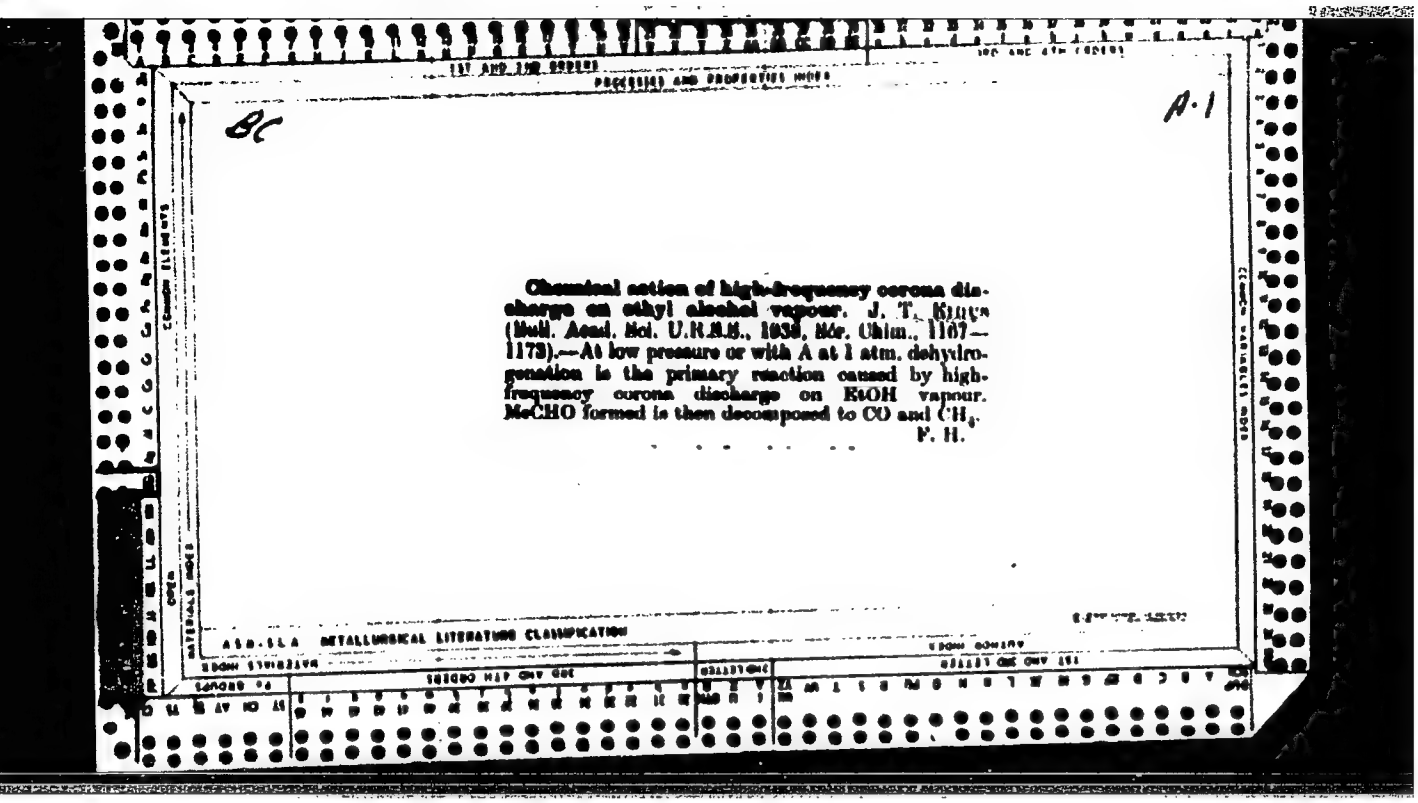


Ca

4

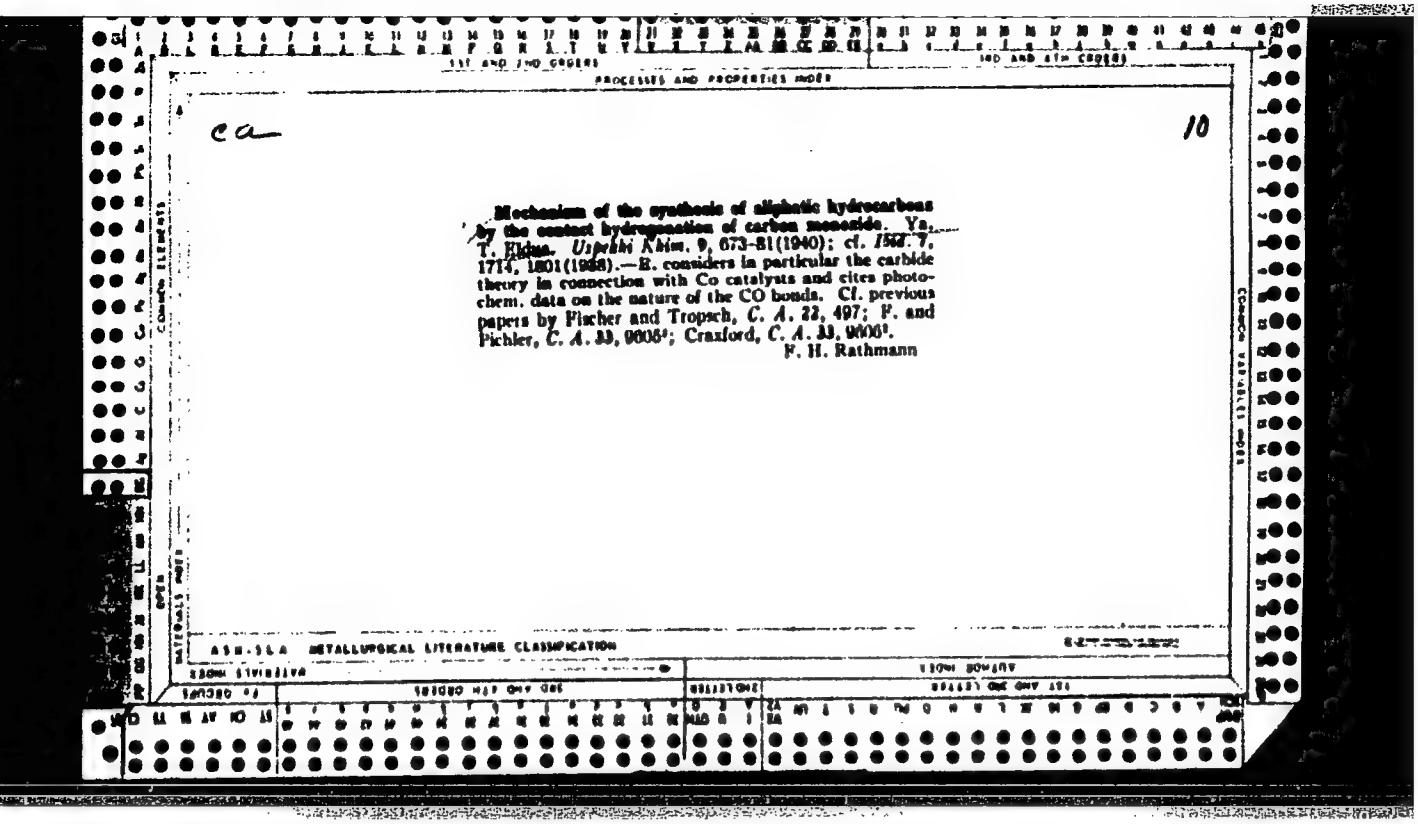
Chemical effect of high frequency corona discharge on ethylene. Ya. T. Eidus. *Bull. acad. sci. U. R. S. S., Classe sci. math. nat. Sér. chim.* 1938, 737–51. A study of the effect of high-frequency corona discharge on C_2H_4 in flow, circulation and static systems shows that in the flow system at a rate of flow of 45 cc./min. and in the static system far-reaching polymerization of C_2H_4 takes place with formation of an oily liquid of mol. wt. 450–500 and a semi-solid substance. This is accompanied by cracking of C_2H_4 to H and C. In the flow and circulation systems at a rate of flow of the gas of 100–1000 cc./min. a liquid condensate was obtained. Its fraction b. 0–15° contained up to 3% *butadiene* (based on the reacted C_2H_4). The amt. of butadiene formed increases with increase of the duration of the reaction. In the gaseous phase marked amts. of C_2H_2 and H as well as satd. hydrocarbons are formed. Formation of CH_4 indicates splitting of the C—C bonds. Indications were obtained that C_2H_2 is an intermediate product in the reactions of C_2H_4. The reactions of C_2H_2 in the discharge are thought to follow the chain mechanism. The mechanisms of formation of C_2H_2 and butadiene are outlined. J. G. Tolpin

A56-31A METALLURGICAL LITERATURE CLASSIFICATION



Chemical action of high-frequency corona discharge on ethyl alcohol vapour. J. T. Kuus (Bull. Acad. Sci. U.R.S.S., 1938, Mér. Chim., 1167—1173).—At low pressure or with A at 1 atm. dehydrogenation is the primary reaction caused by high-frequency corona discharge on EtOH vapour. MeCHO formed is then decomposed to CO and CH_4.

F. H.

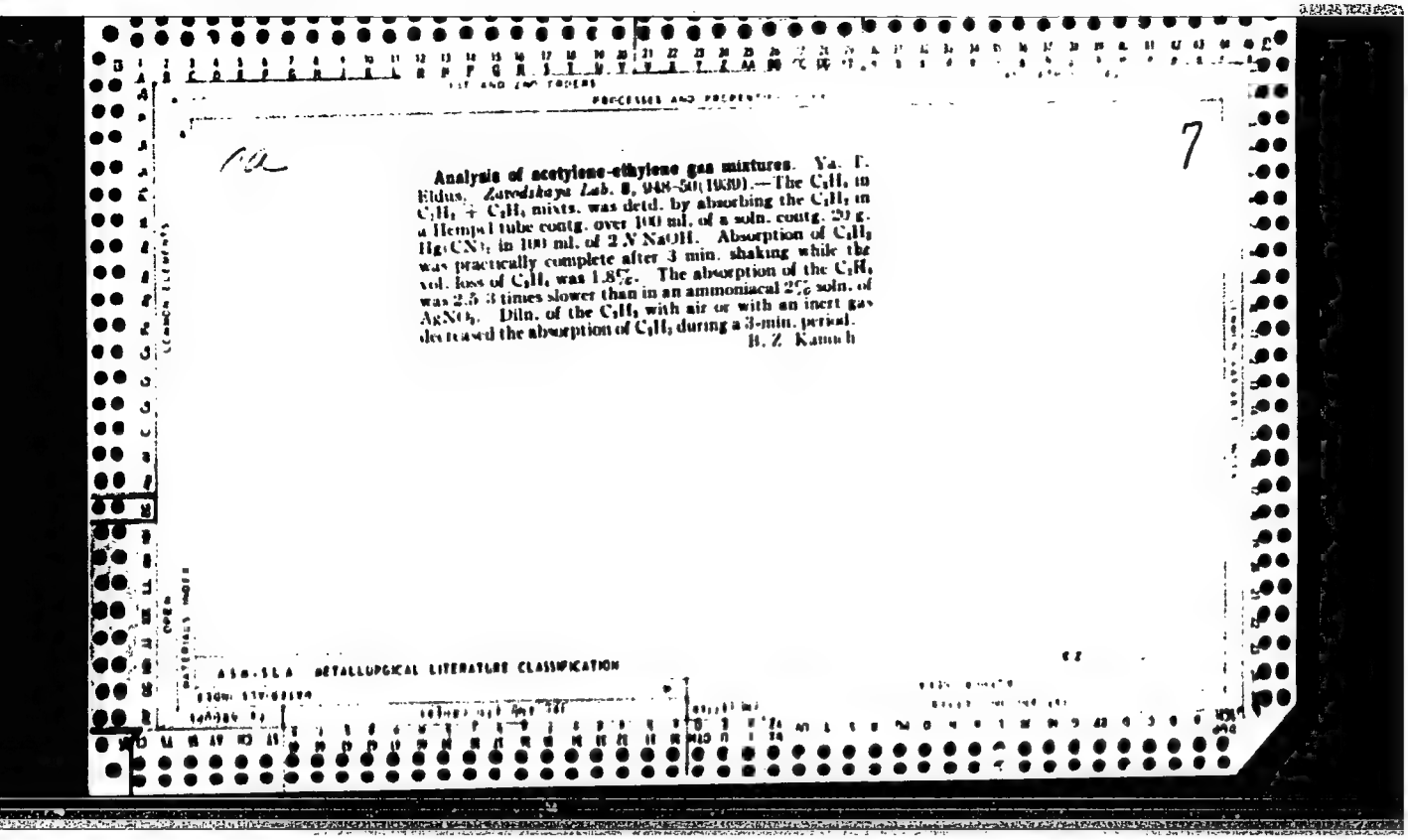


ca

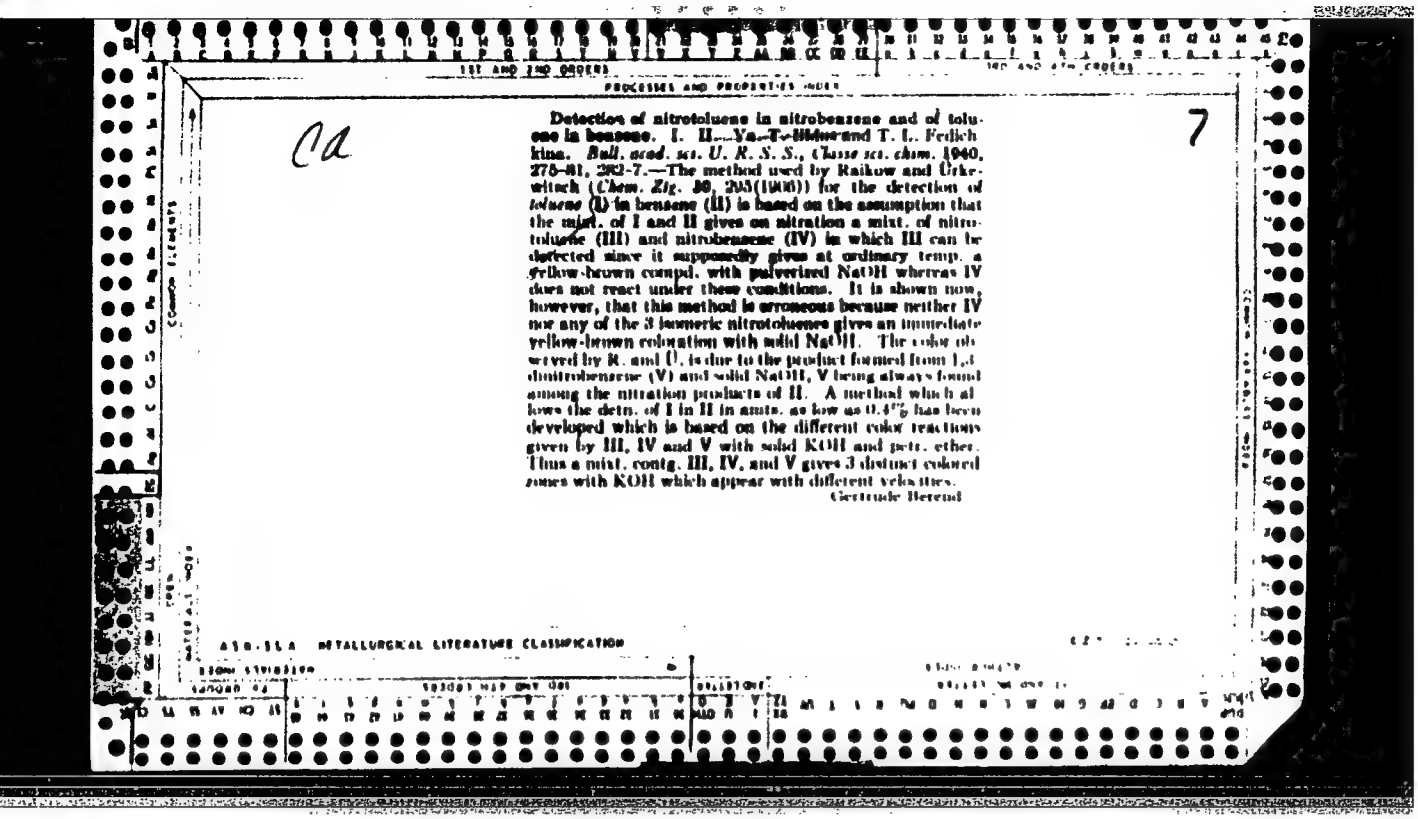
10

Mechanism of the synthesis of aliphatic hydrocarbons by the contact hydrogenation of carbon monoxide. Ya. T. Eidus. *Uspekhi Khim.* 9, 673-81(1940); cf. *I.* 7, 1714, 1801(1938).—E. considers in particular the carbide theory in connection with Co catalysts and cites photochem. data on the nature of the CO bonds. Cf. previous papers by Fischer and Tropsch, *C. A.* 22, 497; F. and Pichler, *C. A.* 33, 9008[1]; Craxford, *C. A.* 33, 9006[1].

F. H. Rathmann



Analysis of acetylene-ethylene gas mixtures. Ya. F. Eldus. *Zavodskaya Lab.* **8**, 948–50(1939).—The C_2H_2 in C_2H_2 + C_2H_4 mixts. was detd. by absorbing the C_2H_2 in a Hempel tube contg. over 100 ml. of a soln. contg. 20 g. $Hg(CN)_2$ in 100 ml. of 2 *N* NaOH. Absorption of C_2H_2 was practically complete after 3 min. shaking while the vol. loss of C_2H_4 was 1.8%. The absorption of the C_2H_2 was 2.5–3 times slower than in an ammoniacal 2% soln. of $AgNO_3$. Diln. of the C_2H_2 with air or with an inert gas decreased the absorption of C_2H_2 during a 3-min. period.
H. Z. Kamuh



PROCESSES AND PROPERTIES INDEX

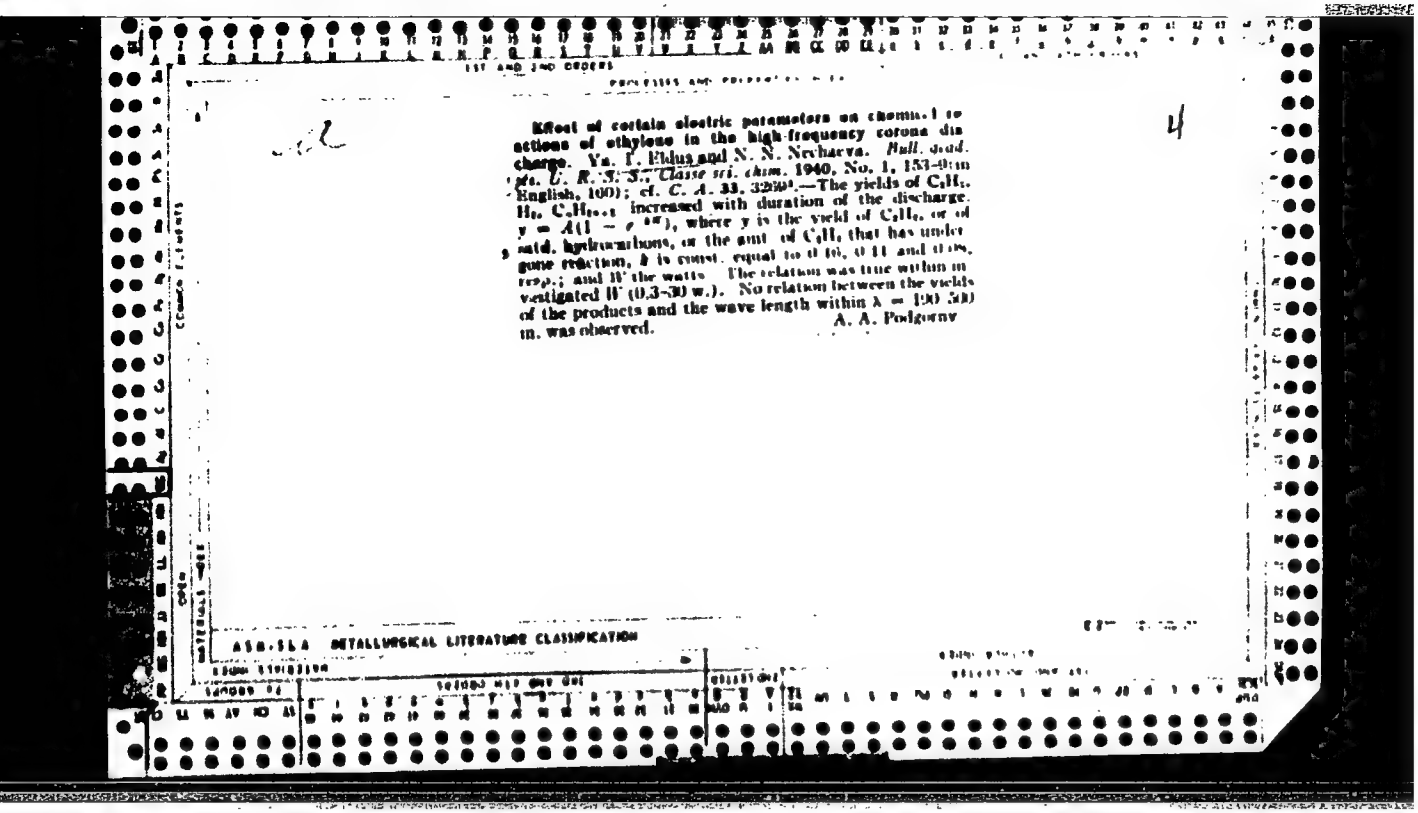
Ca

7

Detection of nitrotoluene in nitrobenzene and of toluene in benzene. I. II.—Ya. T. Eliseev and T. L. Fedich kina. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1940, 278–81, 282–7.—The method used by Raikow and Urkewitsch (*Chem. Zig.* 30, 205(1906)) for the detection of *toluene* (I) in benzene (II) is based on the assumption that the mixt. of I and II gives on nitration a mixt. of nitrotoluene (III) and nitrobenzene (IV) in which III can be detected since it supposedly gives at ordinary temp. a yellow-brown compd. with pulverized NaOH whereas IV does not react under these conditions. It is shown now, however, that this method is erroneous because neither IV nor any of the 3 isomeric nitrotoluenes gives an immediate yellow-brown coloration with solid NaOH. The color observed by R. and U. is due to the product formed from 1,3-dinitrobenzene (V) and solid NaOH, V being always found among the nitration products of II. A method which allows the detn. of I in II in amts. as low as 0.4% has been developed which is based on the different color reactions given by III, IV and V with solid KOH and petr. ether. Thus a mixt. contg. III, IV, and V gives 3 distinct colored zones with KOH which appear with different velocities.

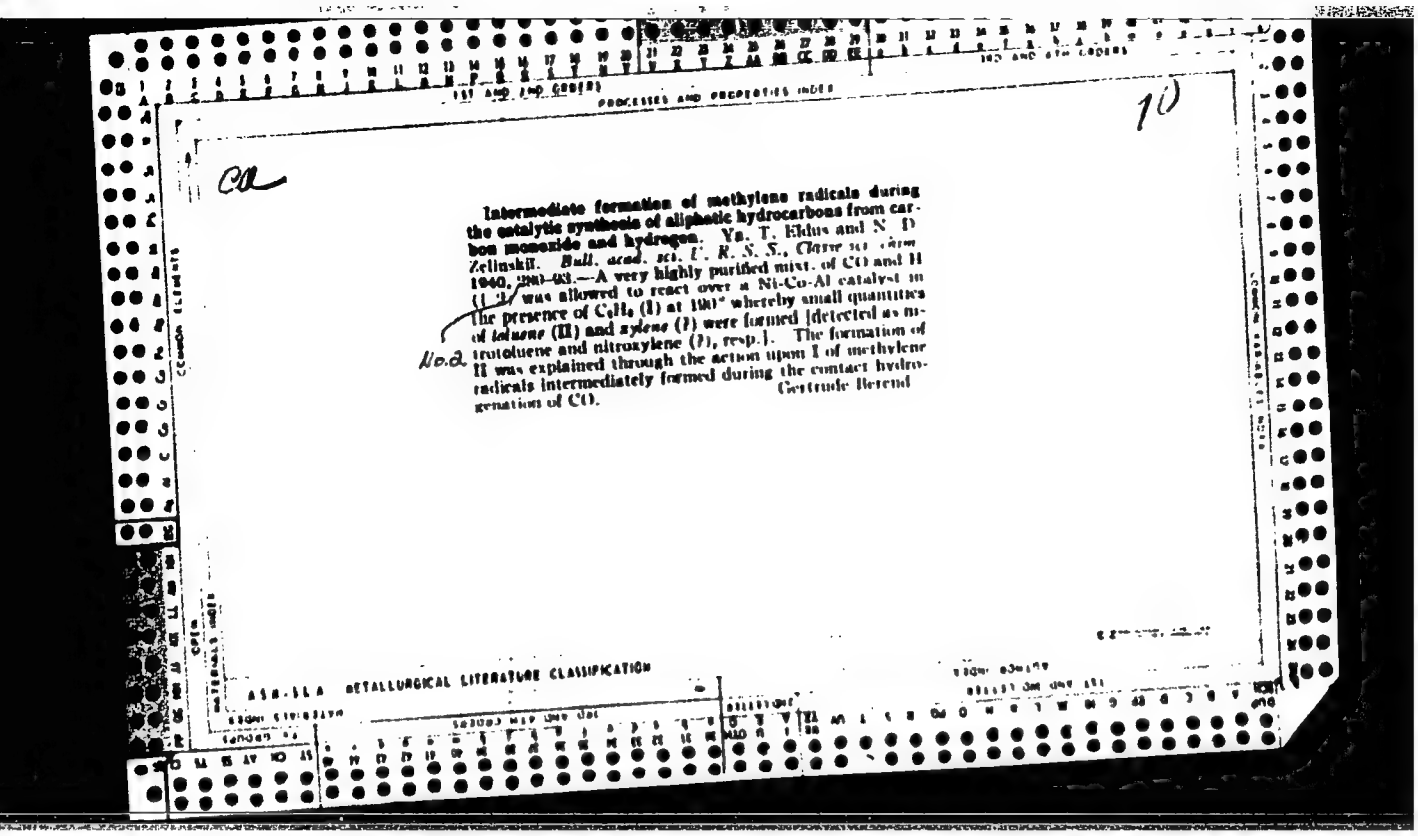
Gertrude Herend

A58-55A METALLURGICAL LITERATURE CLASSIFICATION



Effect of certain electric parameters on chemical reactions of ethylene in the high-frequency corona discharge. Ya. I. Eldus and N. N. Nevzarova. *Bull. Acad. Sci. U. R. S. S., Classe sci. chim.* 1940, No. 1, 153-9 (in English, 100); cf. *C. A.* 33, 3250⁹.—The yields of C_2H_2, H_2, C_nH_{2n-2} increased with duration of the discharge. $y = A(1 - e^{-kt})$, where y is the yield of C_2H_2 or of said hydrocarbons, or the amt. of C_2H_2 that has undergone reaction, k is const. equal to 0.10, 0.11 and 0.08, resp.; and W the watts. The relation was true within investigated W (0.3–30 w.). No relation between the yields of the products and the wave length within $\lambda = 190$–500 m. was observed. A. A. Podgorny

A58.51A METALLURGICAL LITERATURE CLASSIFICATION



PROCESSES AND PROPERTIES INDEX

10

Cl

Intermediate formation of methylene radicals during the catalytic synthesis of aliphatic hydrocarbons from carbon monoxide and hydrogen. Ya. T. Eldus and N. D. Zelinskii. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1940, 293–03.—A very highly purified mixt. of CO and H (1:2) was allowed to react over a Ni-Co-Al catalyst in the presence of C_6H_6 (I) at 180° whereby small quantities of *toluene* (II) and *xylene* (?) were formed [detected as nitrotoluene and nitroxylene (?), resp.]. The formation of II was explained through the action upon I of methylene radicals intermediately formed during the contact hydrogenation of CO.

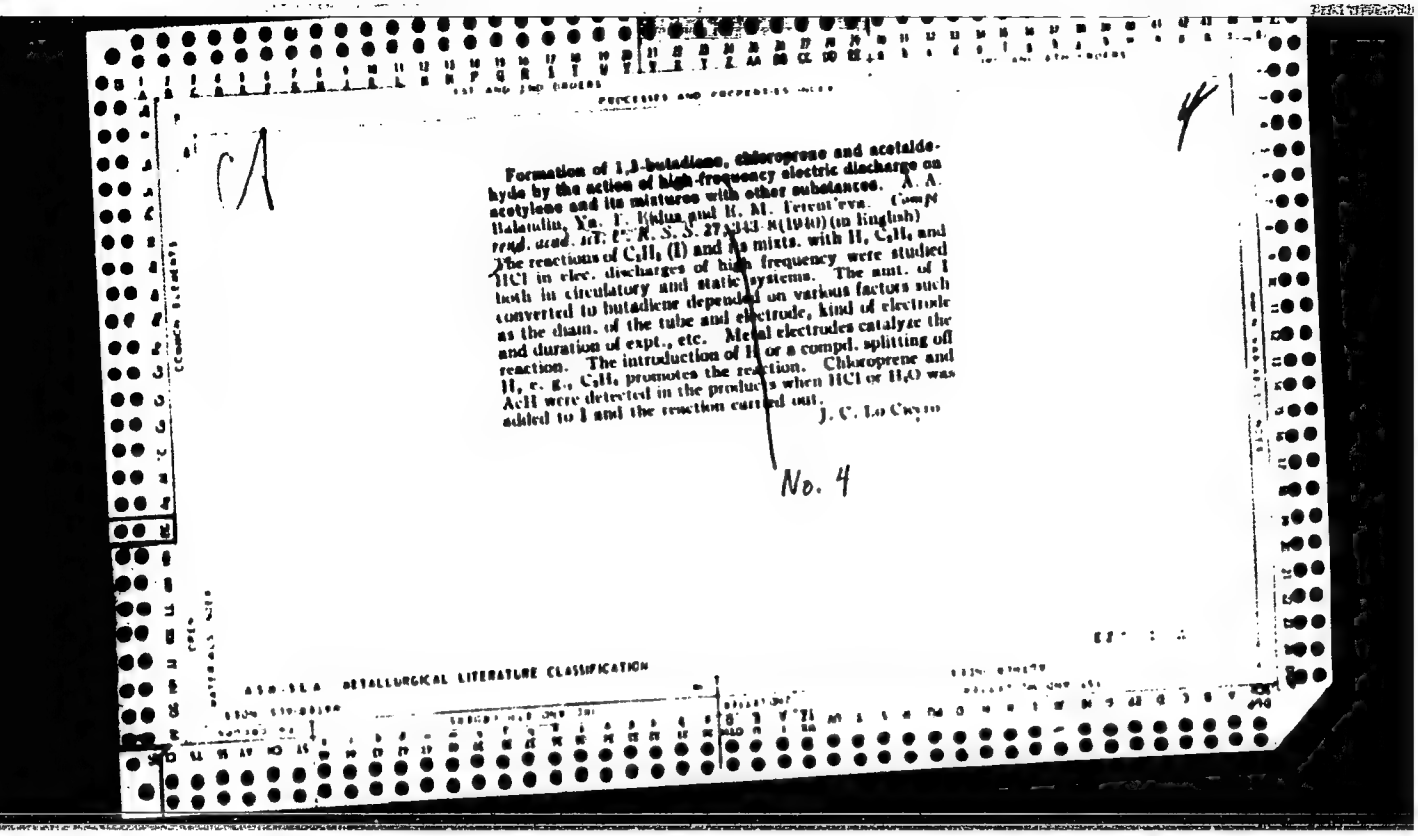
Gertrude Berend

No. 2

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

EIDUS, IA. T.

RT-1420(The mechanism of the synthesis of aliphatic hydrocarbons by the contact hydrogenation of carbon monoxide)
SO: Uspekhi Khimii,9(6): 673-681, 1940 (Orginal Russian source unavialable for review)



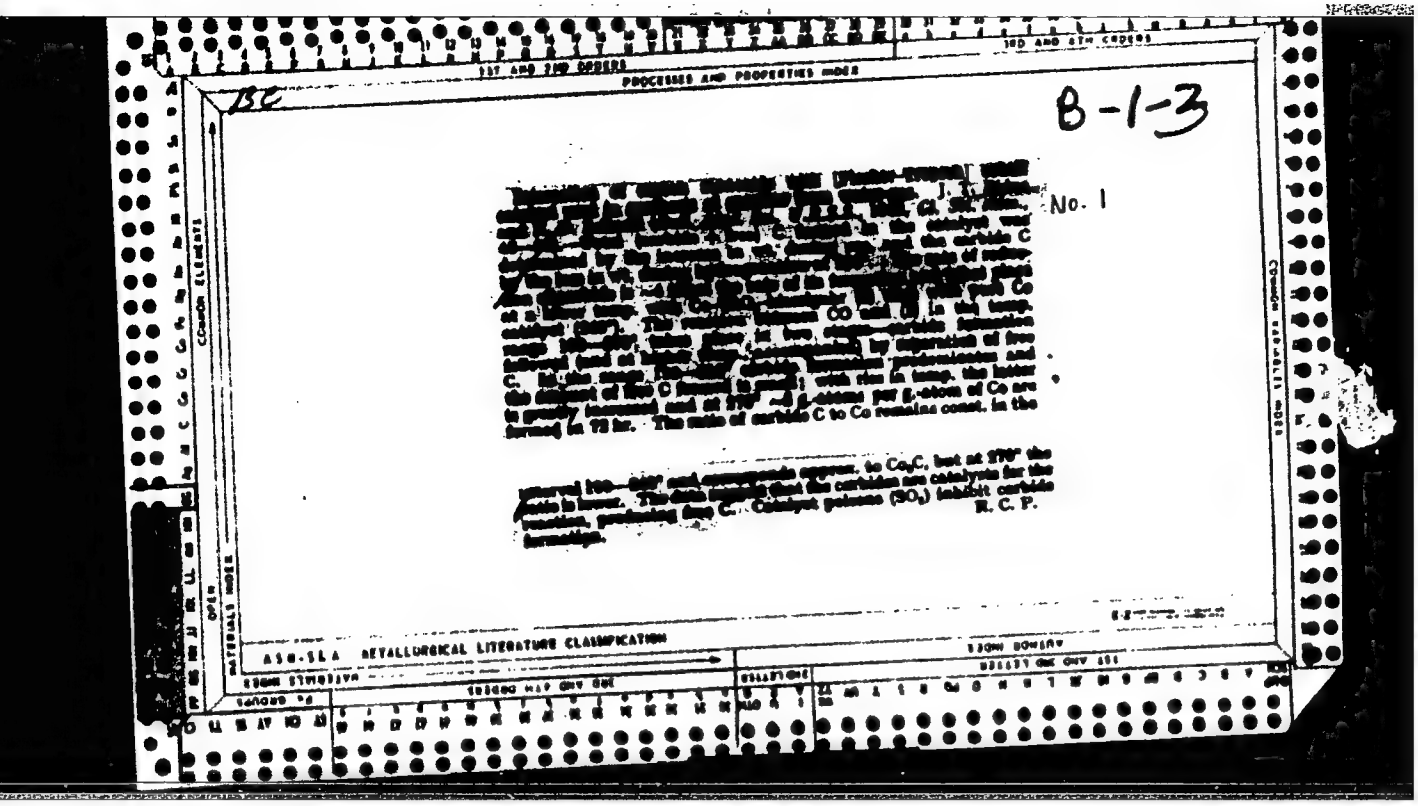
Formation of 1,3-butadiene, chloroprene and acetaldehyde by the action of high-frequency electric discharge on acetylene and its mixtures with other substances. A. A. Balandin, Ya. T. Eidus and R. M. Terent'eva. Compt rend. acad. sci. U.R.S.S. 27, 343-8(1940) (in English)
The reactions of C_2H_2 (I) and its mixts. with H, C_2H_4, and HCl in elec. discharges of high frequency were studied both in circulatory and static systems. The amt. of I converted to butadiene depended on various factors such as the diam. of the tube and electrode, kind of electrode and duration of expt., etc. Metal electrodes catalyze the reaction. The introduction of H or a compd. splitting off H, e. g., C_2H_4, promotes the reaction. Chloroprene and AcH were detected in the products when HCl or H_2O was added to I and the reaction carried out.
J. C. Lo Cicero

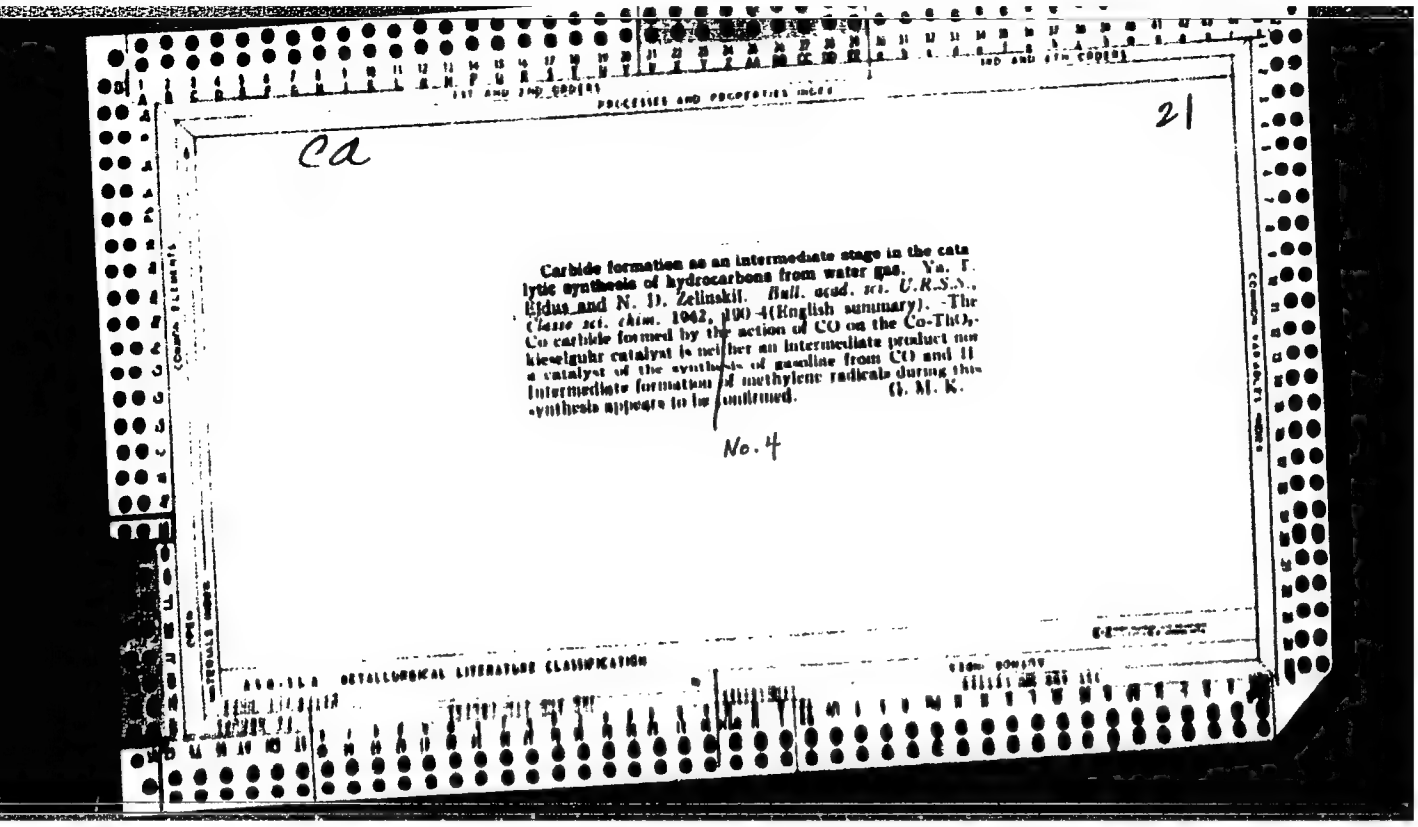
No. 4

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

EYDUS, Ya. T., KAZANSKIY, B. A. and ZELINSKIY, N. D.

"The Influence of the Type of Carrier on the Synthesis of Liquid Hydrocarbons Over Ni-MnO-Al_2O_3 Catalysts at Atmospheric Pressure," Iz. Ak. Nauk SSSR, Otdel Tekh Nauk, pp 27-33, 1941



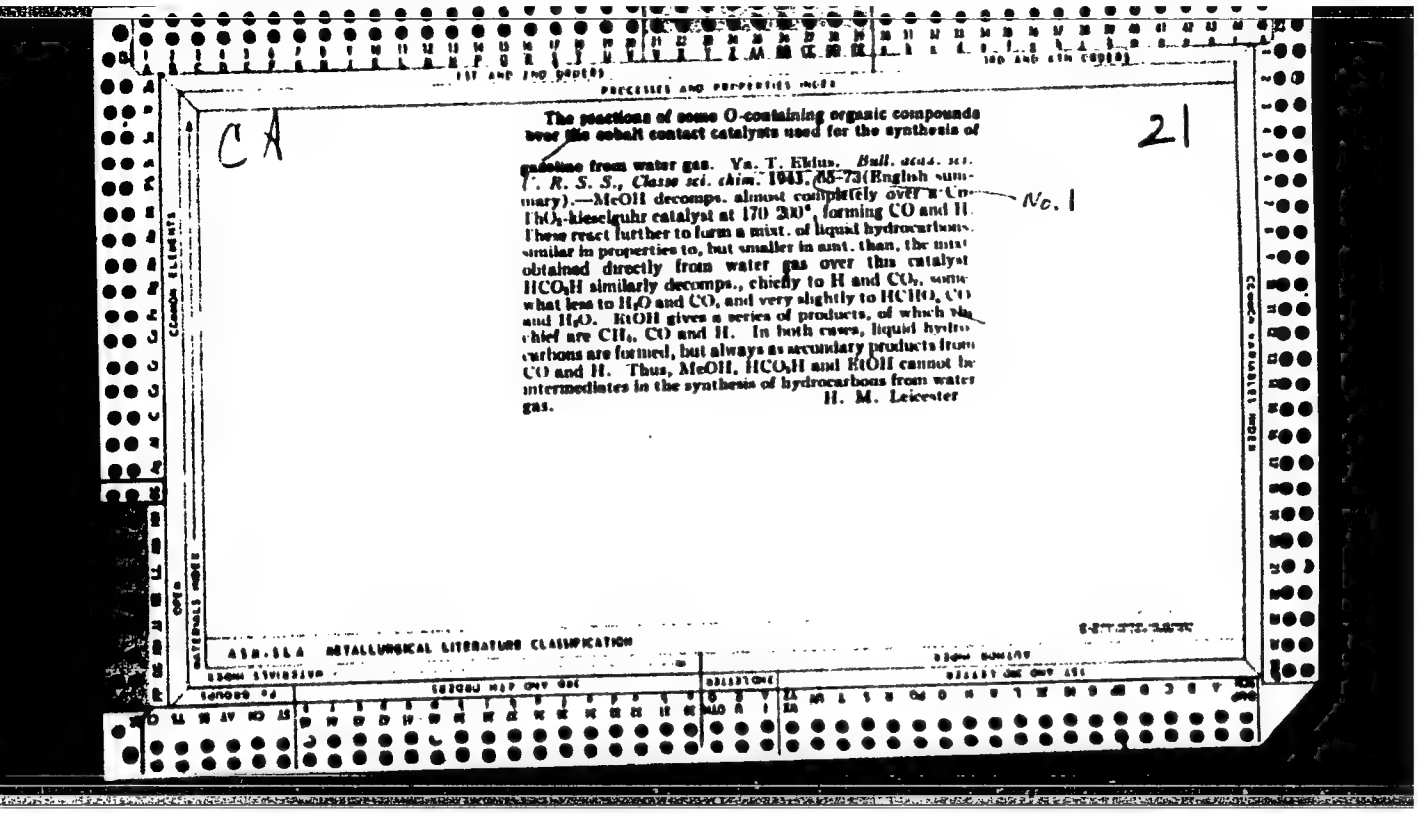


Ca

21

Carbide formation as an intermediate stage in the catalytic synthesis of hydrocarbons from water gas. Ya. T. Eidus and N. D. Zelinskii. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1942, 190-4(English summary).—The Co carbide formed by the action of CO on the Co-ThO$_2$-kieselguhr catalyst is neither an intermediate product nor a catalyst of the synthesis of gasoline from CO and H. Intermediate formation of methylene radicals during this synthesis appears to be confirmed. G. M. K.

No. 4



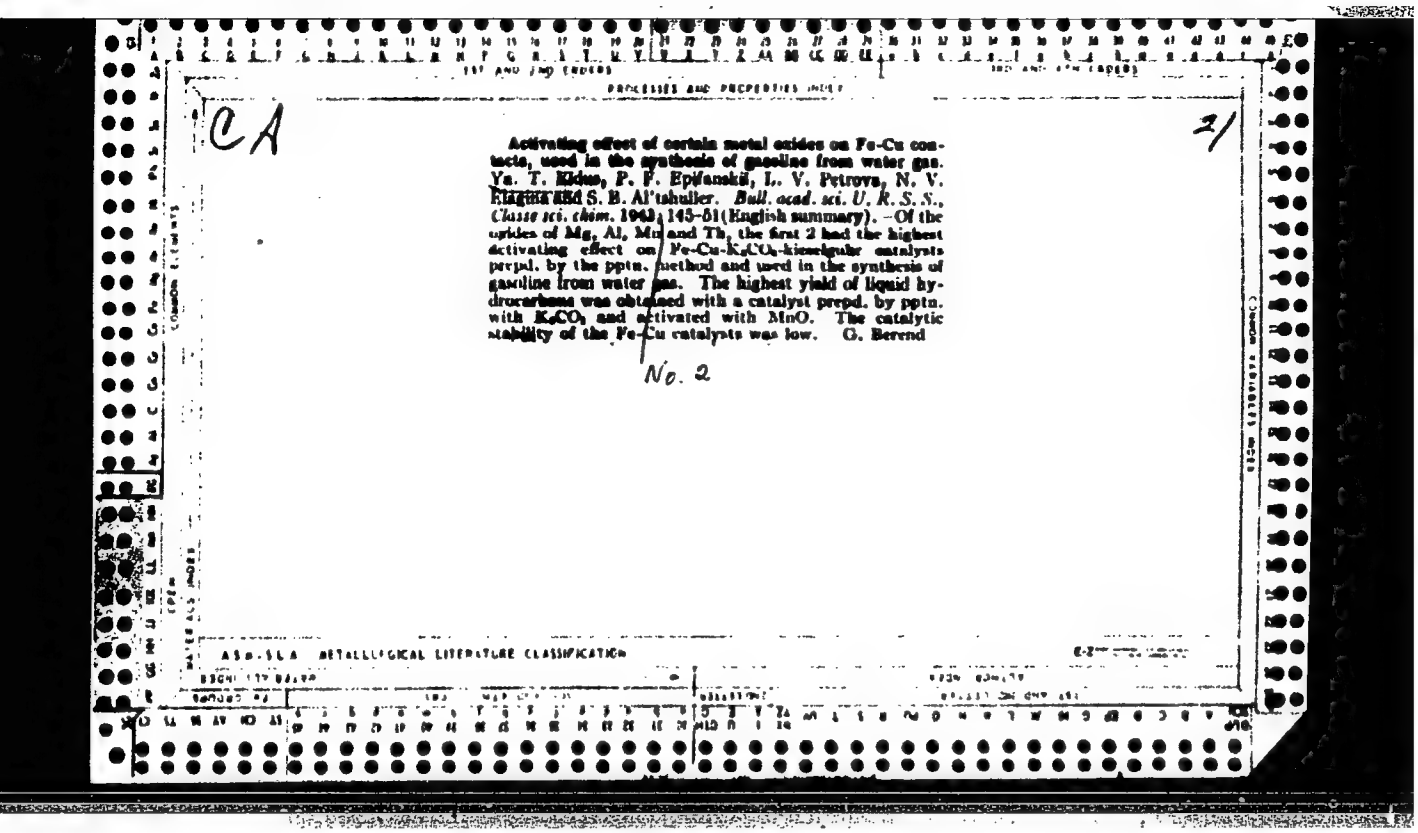
CA

21

The reactions of some O-containing organic compounds over the cobalt contact catalysts used for the synthesis of gasoline from water gas. Ya. T. Eliuš. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1943, 65-73 (English summary).—MeOH decomps. almost completely over a Cr$_2$O$_3$-ThO$_2$-kieselguhr catalyst at 170-210°, forming CO and H. These react further to form a mixt. of liquid hydrocarbons similar in properties to, but smaller in amt. than, the mixt. obtained directly from water gas over this catalyst. HCO$_2$H similarly decomps., chiefly to H and CO$_2$, somewhat less to H$_2$O and CO, and very slightly to HCHO, CO and H$_2$O. EtOH gives a series of products, of which the chief are CH$_4$, CO and H. In both cases, liquid hydrocarbons are formed, but always as secondary products from CO and H. Thus, MeOH, HCO$_2$H and EtOH cannot be intermediates in the synthesis of hydrocarbons from water gas.

H. M. Leicester

No. 1



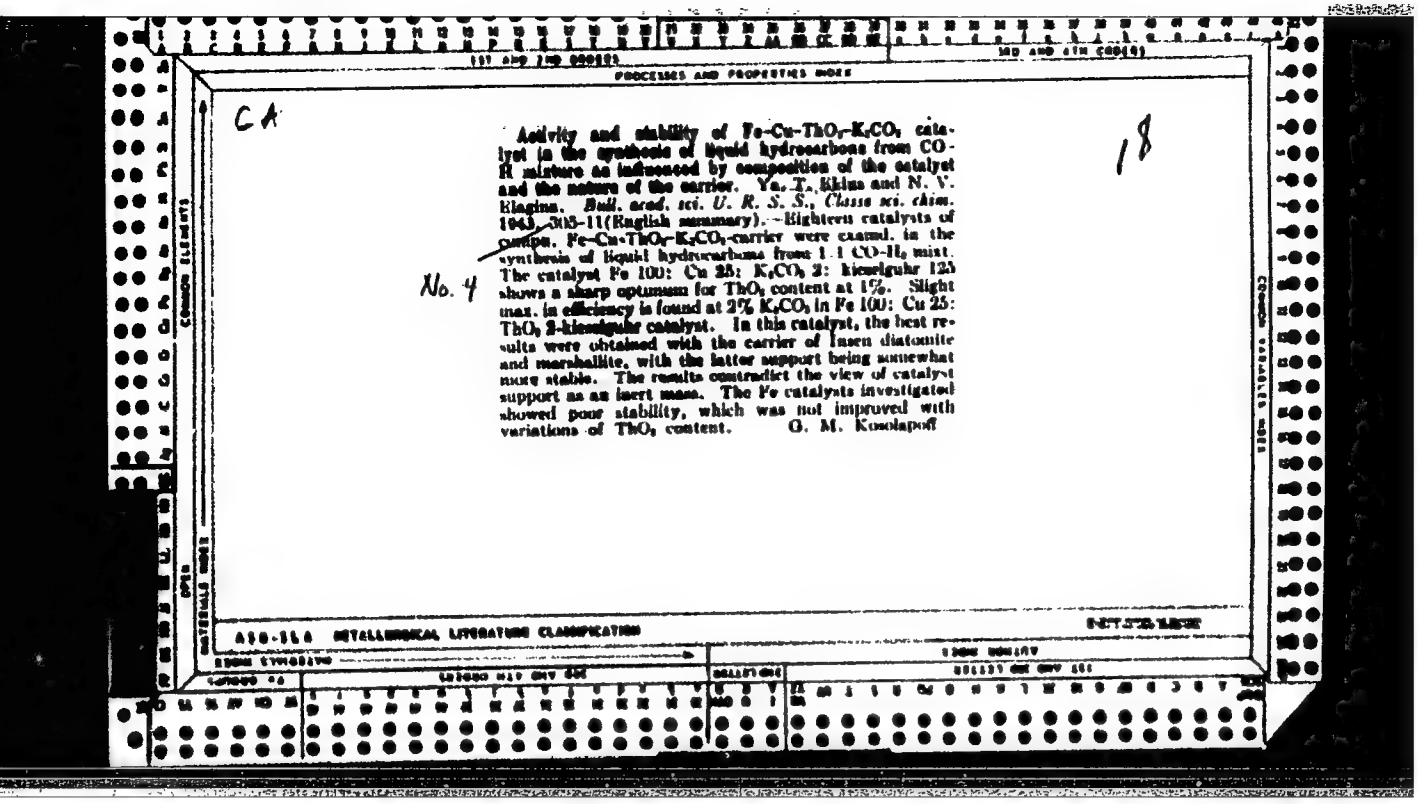
CA

21

Activating effect of certain metal oxides on Fe-Cu contacts, used in the synthesis of gasoline from water gas. Ya. T. Eidus, P. F. Epifanskii, L. V. Petrova, N. V. Elagina and S. B. Al'tshuller. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1943, 145-51(English summary). —Of the oxides of Mg, Al, Mn and Th, the first 2 had the highest activating effect on Fe-Cu-K_2CO_3-kieselguhr catalysts prepd. by the pptn. method and used in the synthesis of gasoline from water gas. The highest yield of liquid hydrocarbons was obtained with a catalyst prepd. by pptn. with K_2CO_3 and activated with MnO. The catalytic stability of the Fe-Cu catalysts was low. G. Berend

No. 2

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

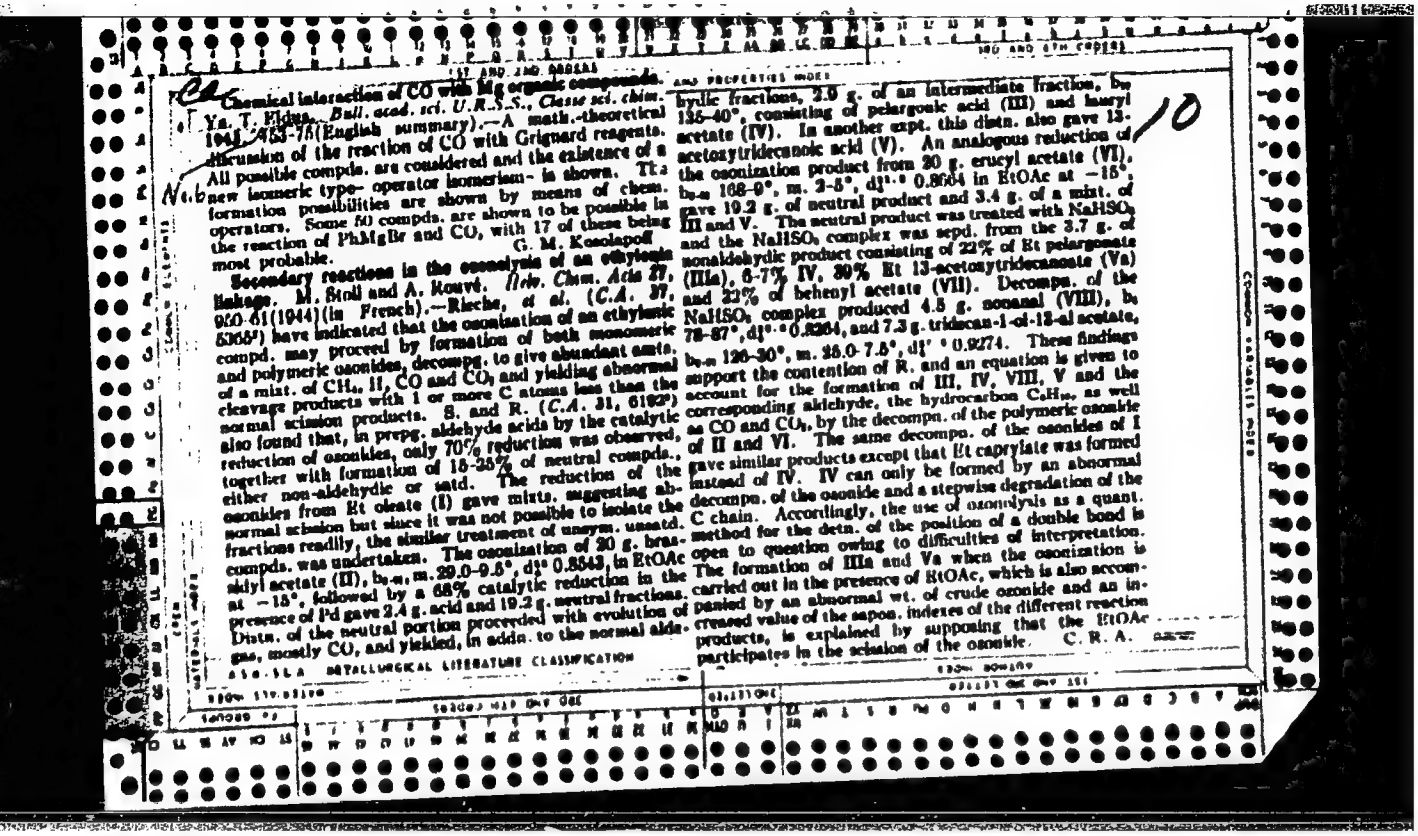


CA

18

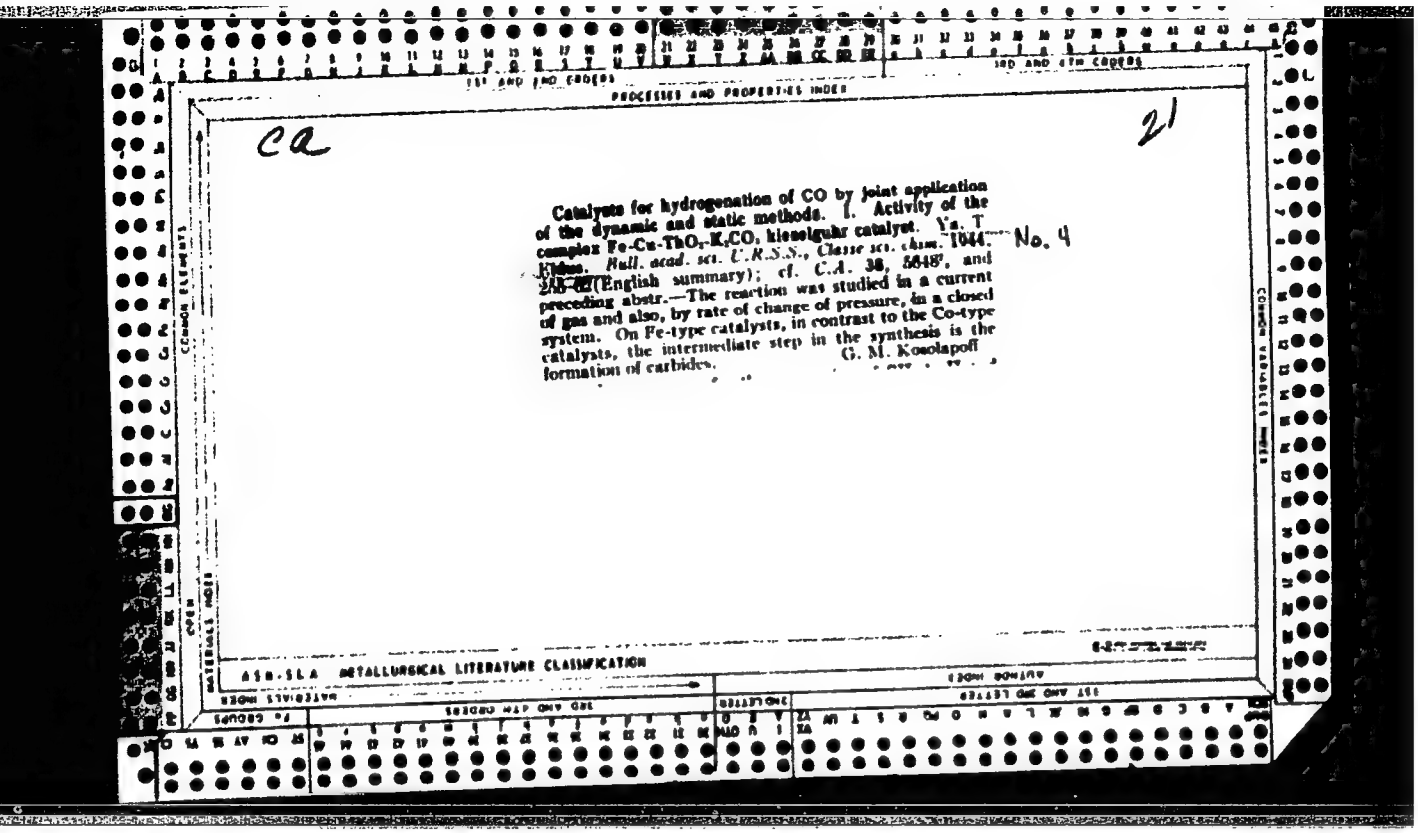
No. 4

Activity and stability of Fe-Cu-ThO_2-K_2CO_3 catalyst in the synthesis of liquid hydrocarbons from CO-H mixture as influenced by composition of the catalyst and the nature of the carrier. Ya. T. Eliua and N. V. Kiagina. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1943, 305-11(English summary).—Eighteen catalysts of compn. Fe-Cu-ThO_2-K_2CO_3-carrier were examd. in the synthesis of liquid hydrocarbons from 1:1 CO-H_2 mixt. The catalyst Fe 100: Cu 25: K_2CO_3 2: kieselguhr 125 shows a sharp optimum for ThO_2 content at 1%. Slight max. in efficiency is found at 2% K_2CO_3 in Fe 100: Cu 25: ThO_2 2-kieselguhr catalyst. In this catalyst, the best results were obtained with the carrier of Inzen diatomite and marshallite, with the latter support being somewhat more stable. The results contradict the view of catalyst support as an inert mass. The Fe catalysts investigated showed poor stability, which was not improved with variations of ThO_2 content. G. M. Kosolapoff



Chemical interaction of CO with Mg organic compounds. Ya. T. Eliav. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1944, 455-76 (English summary).—A math.-theoretical discussion of the reaction of CO with Grignard reagents. All possible compds. are considered and the existence of a new isomeric type—operator isomerism—is shown. The formation possibilities are shown by means of chem. operators. Some 50 compds. are shown to be possible in the reaction of PhMgBr and CO, with 17 of these being most probable. G. M. Kosolapoff

Secondary reactions in the ozonolysis of an ethylenic linkage. M. Stoll and A. Rouvé. *Helv. Chim. Acta* 27, 920-51 (1944) (in French).—Rieche, *et al.* (*C.A.* 37, 5068⁹) have indicated that the ozonization of an ethylenic compd. may proceed by formation of both monomeric and polymeric ozonides, decompg. to give abundant emts. of a mixt. of CH_4, H_2, CO and CO_2 and yielding abnormal cleavage products with 1 or more C atoms less than the normal scission products. S. and R. (*C.A.* 31, 6192⁹) also found that, in prepg. aldehyde acids by the catalytic reduction of ozonides, only 70% reduction was observed, together with formation of 18-25% of neutral compds., either non-aldehydic or satd. The reduction of the ozonides from Et oleate (I) gave mixts. suggesting abnormal scission but since it was not possible to isolate the fractions readily, the similar treatment of unsym. unsatd. compds. was undertaken. The ozonization of 20 g. brassidyl acetate (II), $b_{0.4}$, m. 29.0-9.5°, d_4^{20} 0.8543, in EtOAc at −15°, followed by a 68% catalytic reduction in the presence of Pd gave 2.4 g. acid and 19.2 g. neutral fractions. Distn. of the neutral portion proceeded with evolution of gas, mostly CO, and yielded, in addn. to the normal aldehydic fractions, 2.0 g. of an intermediate fraction, bp 135-40°, consisting of pelargonic acid (III) and lauryl acetate (IV). In another expt. this distn. also gave 13-acetoxytridecanoic acid (V). An analogous reduction of the ozonization product from 30 g. erucyl acetate (VI), $b_{0.4}$ 168-9°, m. 2-5°, $d_4^{21.5}$ 0.8664 in EtOAc at −15°, gave 19.2 g. of neutral product and 3.4 g. of a mixt. of III and V. The neutral product was treated with $NaHSO_3$ and the $NaHSO_3$ complex was sepd. from the 3.7 g. of nonaldehydic product consisting of 22% of Et pelargonate (IIIa), 6-7% IV, 30% Et 13-acetoxytridecanoate (Va) and 22% of behenyl acetate (VII). Decompn. of the $NaHSO_3$ complex produced 4.8 g. nonanal (VIII), $b_{0.4}$ 78-87°, $d_4^{20.5}$ 0.8264, and 7.3 g. tridecan-1-ol-13-al acetate, $b_{0.4}$ 120-30°, m. 25.0-7.5°, $d_4^{27.5}$ 0.9274. These findings support the contention of R. and an equation is given to account for the formation of III, IV, VIII, V and the corresponding aldehyde, the hydrocarbon C_8H_{16}, as well as CO and CO_2, by the decompn. of the polymeric ozonide of II and VI. The same decompn. of the ozonides of I gave similar products except that Et caprylate was formed instead of IV. IV can only be formed by an abnormal decompn. of the ozonide and a stepwise degradation of the C chain. Accordingly, the use of ozonolysis as a quant. method for the detn. of the position of a double bond is open to question owing to difficulties of interpretation. The formation of IIIa and Va when the ozonization is carried out in the presence of EtOAc, which is also accompanied by an abnormal wt. of crude ozonide and an increased value of the sapon. indexes of the different reaction products, is explained by supposing that the EtOAc participates in the scission of the ozonide. C. R. A.



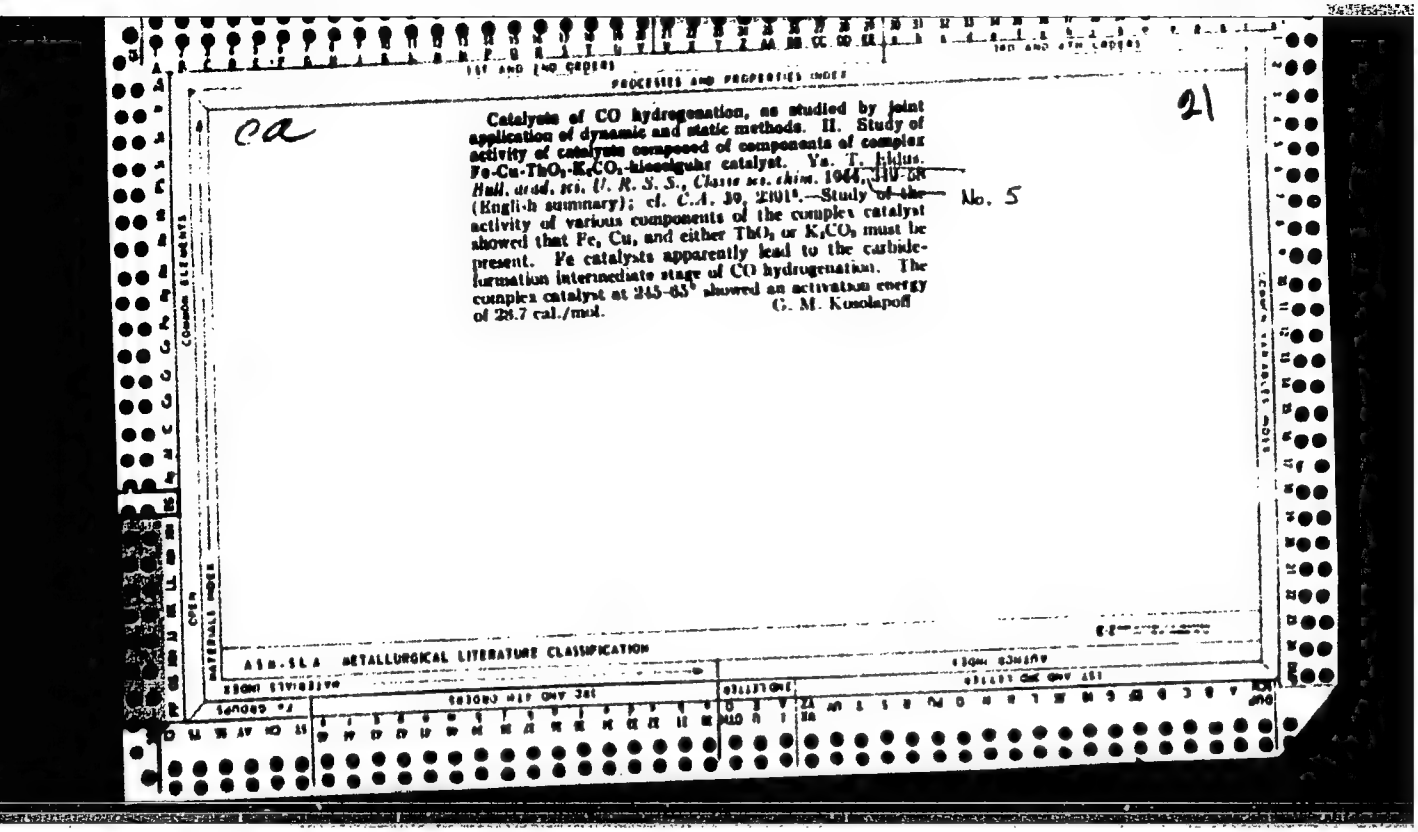
ca

21

Catalysts for hydrogenation of CO by joint application of the dynamic and static methods. I. Activity of the complex Fe-Cu-ThO_2-K_2CO_3 kieselguhr catalyst. Ya. T. Eidus. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1944, No. 4 [English summary]; cf. *C.A.* 38, 5648[8], and preceding abstr.—The reaction was studied in a current of gas and also, by rate of change of pressure, in a closed system. On Fe-type catalysts, in contrast to the Co-type catalysts, the intermediate step in the synthesis is the formation of carbides.

G. M. Kosolapoff

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



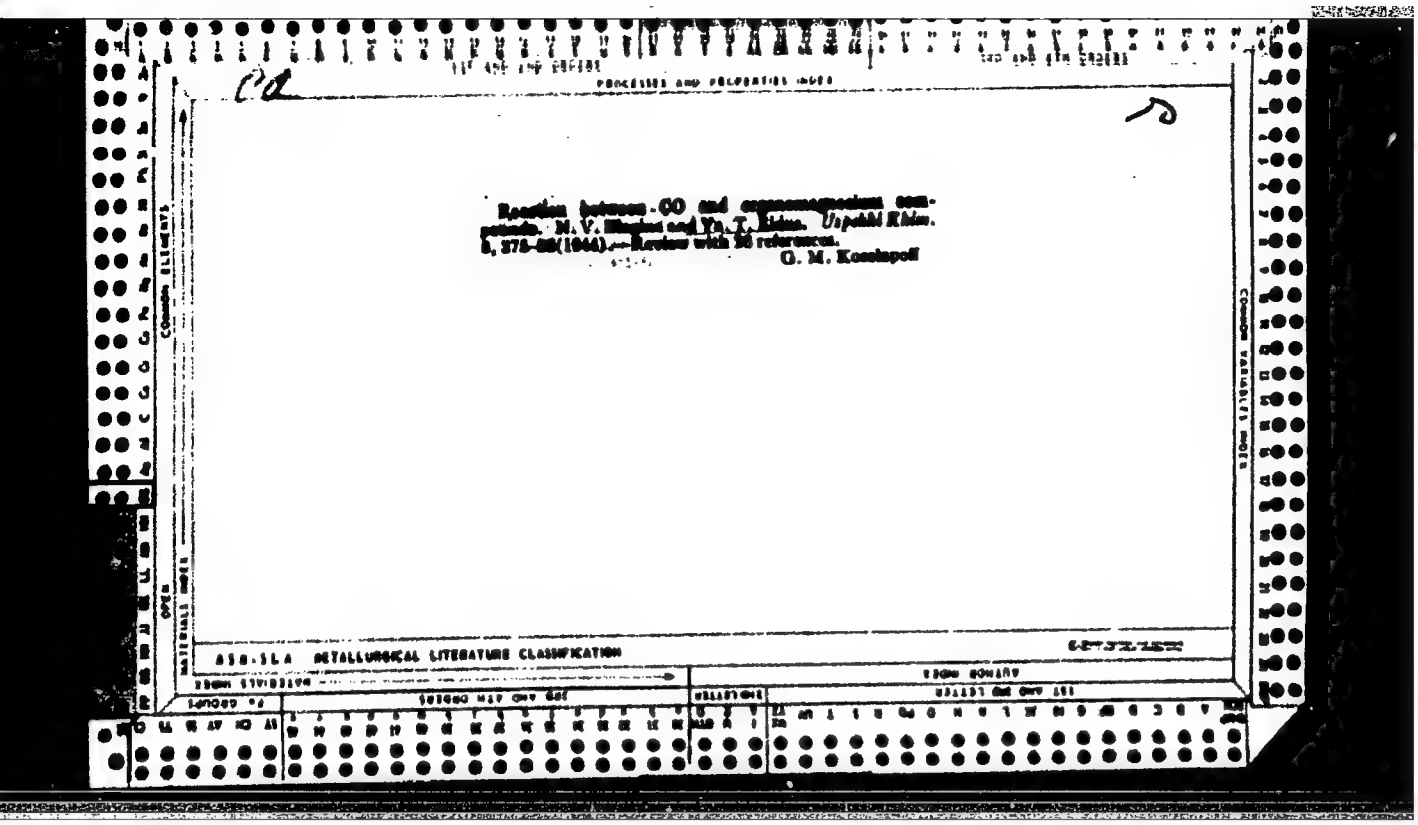
ca

21

Catalysts of CO hydrogenation, as studied by joint application of dynamic and static methods. II. Study of activity of catalysts composed of components of complex Fe-Cu-ThO_2-K_2CO_3-kieselguhr catalyst. Ya. T. Eidus. *Bull. acad. sci. U. R. S. S., Classe sci. chim.* 1944, 310-58 (English summary); cf. *C.A.* 39, 2101[8].—Study of the activity of various components of the complex catalyst showed that Fe, Cu, and either ThO_2 or K_2CO_3 must be present. Fe catalysts apparently lead to the carbide-formation intermediate stage of CO hydrogenation. The complex catalyst at 245-65° showed an activation energy of 28.7 cal./mol. G. M. Kosolapoff

No. 5

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

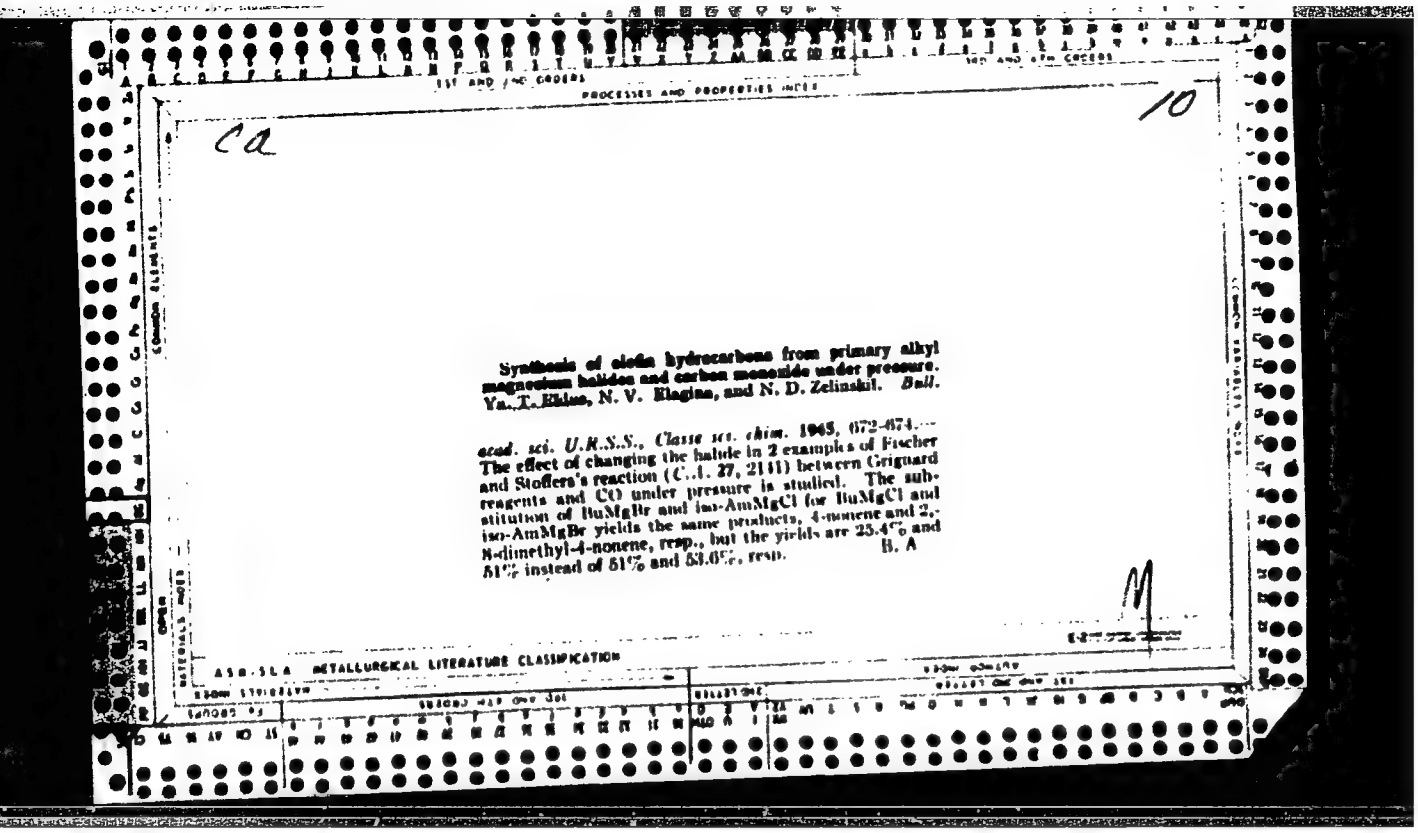


Reaction between CO and organomagnesium compounds. N. V. [illegible] and Ya. T. Eidus. *Uspekhi Khim.* 8, 375–88(1944).—Review with 36 references.
O. M. Kosmapoff

A58-SLA METALLURGICAL LITERATURE CLASSIFICATION

Bi abs.

Catalysts for hydrogenation of carbon monoxide. III. Rôle of the alkaline activator in forming the surface of the Fe-Cu-ThO_2-K_2SO_3-kieselguhr catalyst. I. T. Eldus (*Bull. Acad. Sci. U.R.S.S., Cl. Sci. Chim.*, 1945, 62—70).—The composite catalyst Fe-Cu-ThO_2-K_2CO_3-kieselguhr (100 : 25 : 2 : 2 : 125) has no effect in catalysing the hydrogenation of CO_2 at 255° by H_2. Tests with various combinations of the components show that K_2CO_3 causes interaction of CO_2 and catalyst surface; even traces present in "non-alkali-activated catalysts" migrate to the surface and after a time such catalysts show some activity. Presence of ThO_2 assists this migration, which results in formation of metal carbide and CO; the latter may be hydrogenated. R. To.



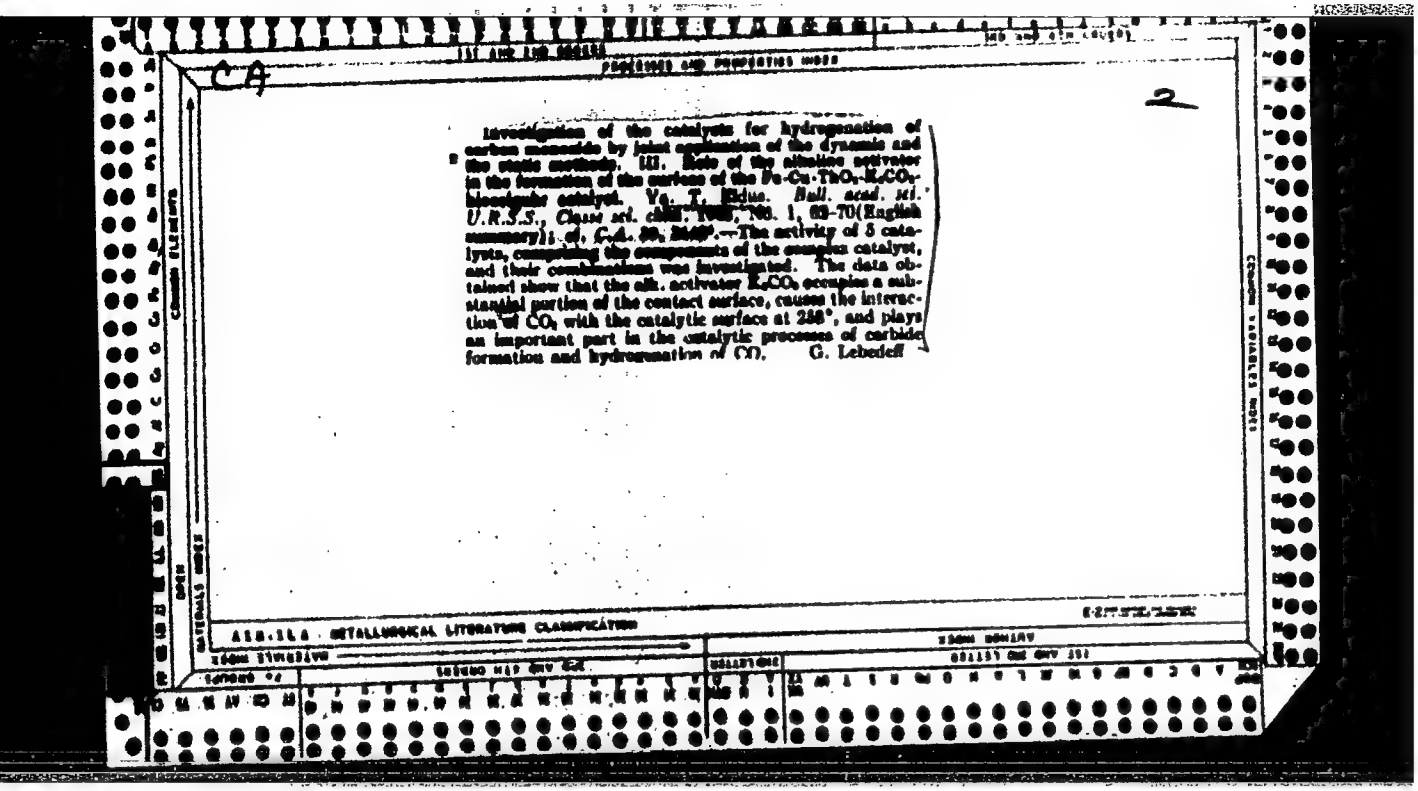
Ca

10

Synthesis of olefin hydrocarbons from primary alkyl magnesium halides and carbon monoxide under pressure. Ya. T. Eliav, N. V. Elagina, and N. D. Zelinskii. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1945, 672-674.—The effect of changing the halide in 2 examples of Fischer and Stoffers's reaction (C.A. 27, 2141) between Grignard reagents and CO under pressure is studied. The substitution of BuMgBr and iso-AmMgCl for BuMgCl and iso-AmMgBr yields the same products, 4-nonene and 2,8-dimethyl-4-nonene, resp., but the yields are 25.4% and 51% instead of 51% and 53.6%, resp. B. A

M

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

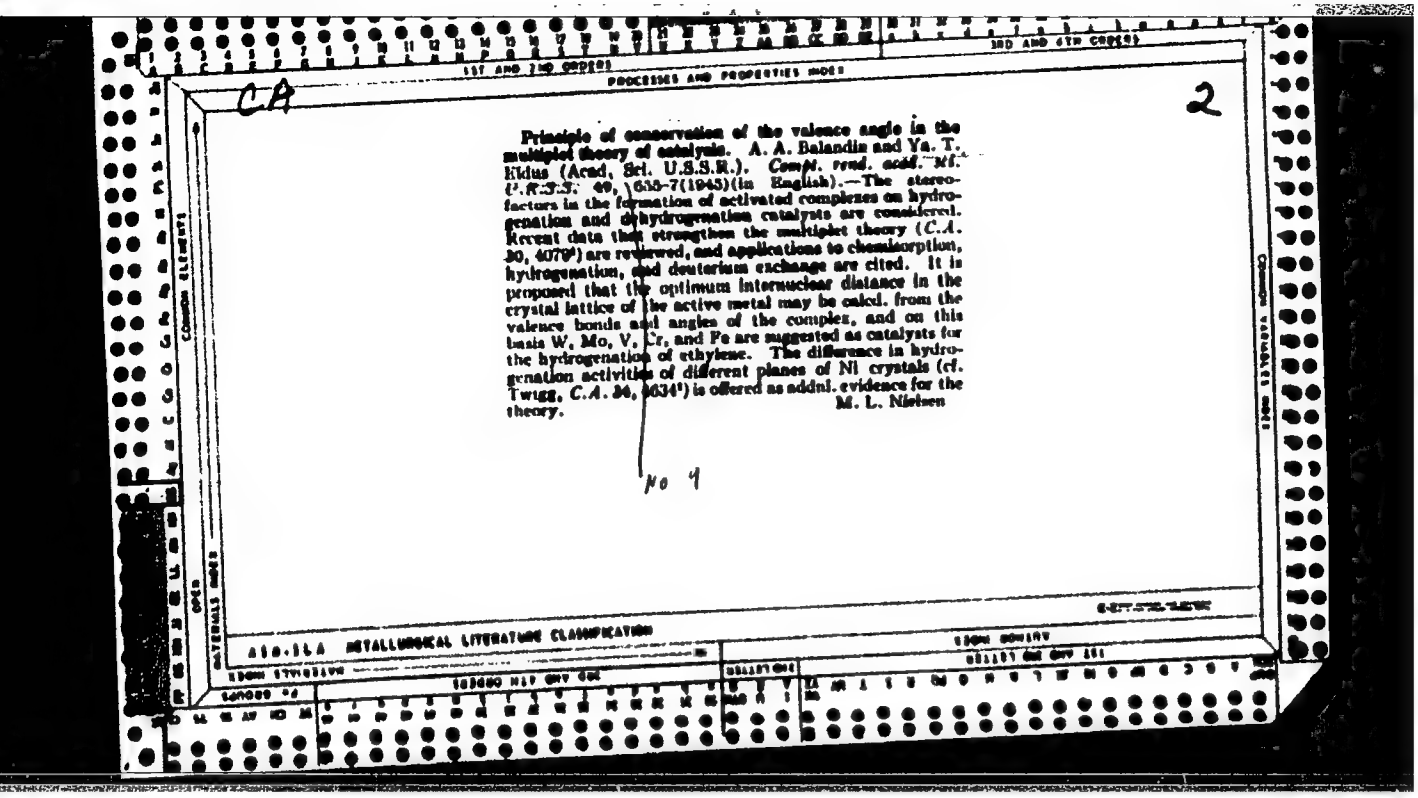


CA

2

Investigation of the catalysts for hydrogenation of carbon monoxide by joint application of the dynamic and the static methods. III. Role of the alkaline activator in the formation of the surface of the Fe-Cu-ThO_2-K_2CO_3-kieselguhr catalyst. Ya. T. Eidus. *Bull. acad. sci. U.R.S.S., Classe sci. chim.* 1945, No. 1, 65-70 (English summary); cf. *C.A.* 39, 3649⁸.—The activity of 5 catalysts, comprising the components of the complex catalyst, and their combinations was investigated. The data obtained show that the alk. activator K_2CO_3 occupies a substantial portion of the contact surface, causes the interaction of CO with the catalytic surface at 250°, and plays an important part in the catalytic processes of carbide formation and hydrogenation of CO. G. Lebedeff

A58.1&A - METALLURGICAL LITERATURE CLASSIFICATION



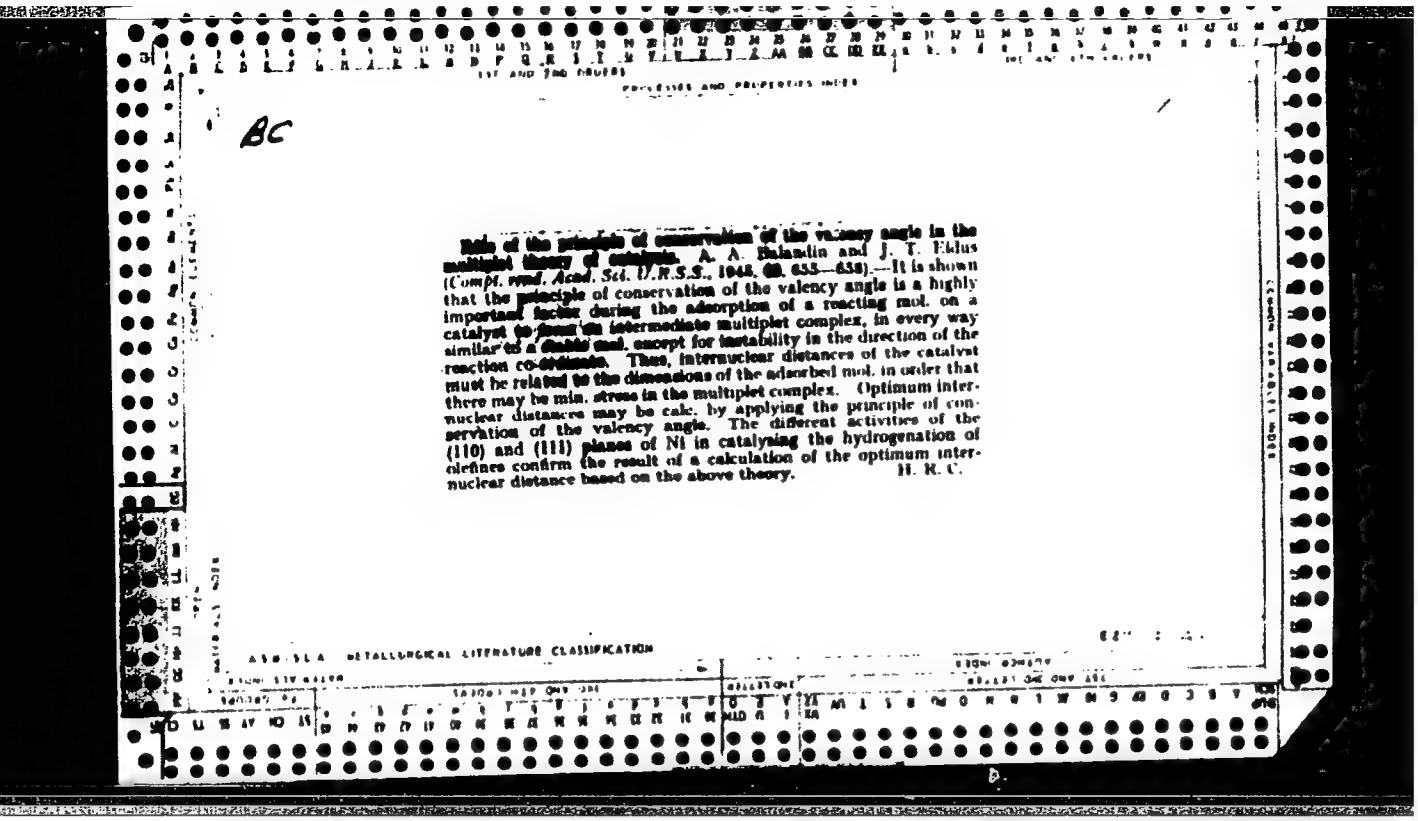
CA

2

Principle of conservation of the valence angle in the multiplet theory of catalysis. A. A. Balandin and Ya. T. Eidus (Acad. Sci. U.S.S.R.). *Compt. rend. acad. Sci. U.R.S.S.* 49, 635-7(1945)(in English).—The stereo-factors in the formation of activated complexes on hydro-genation and dehydrogenation catalysts are considered. Recent data that strengthen the multiplet theory (*C.A.* 30, 4079[2]) are reviewed, and applications to chemisorption, hydrogenation, and deuterium exchange are cited. It is proposed that the optimum internuclear distance in the crystal lattice of the active metal may be calcd. from the valence bonds and angles of the complex, and on this basis W, Mo, V, Cr, and Fe are suggested as catalysts for the hydrogenation of ethylene. The difference in hydro-genation activities of different planes of Ni crystals (cf. Twigg, *C.A.* 34, 4634[1]) is offered as addnl. evidence for the theory.

M. L. Nielsen

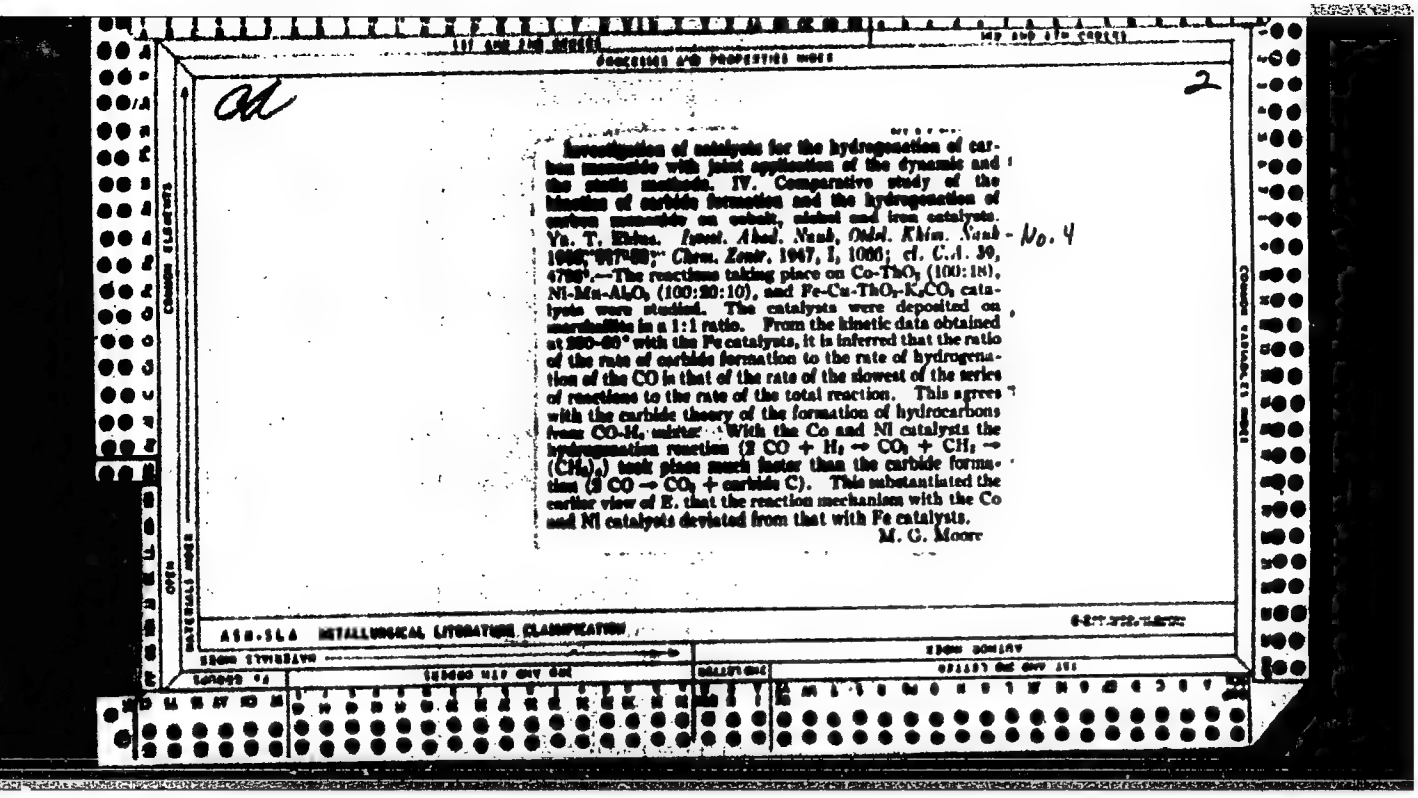
No 4



BC

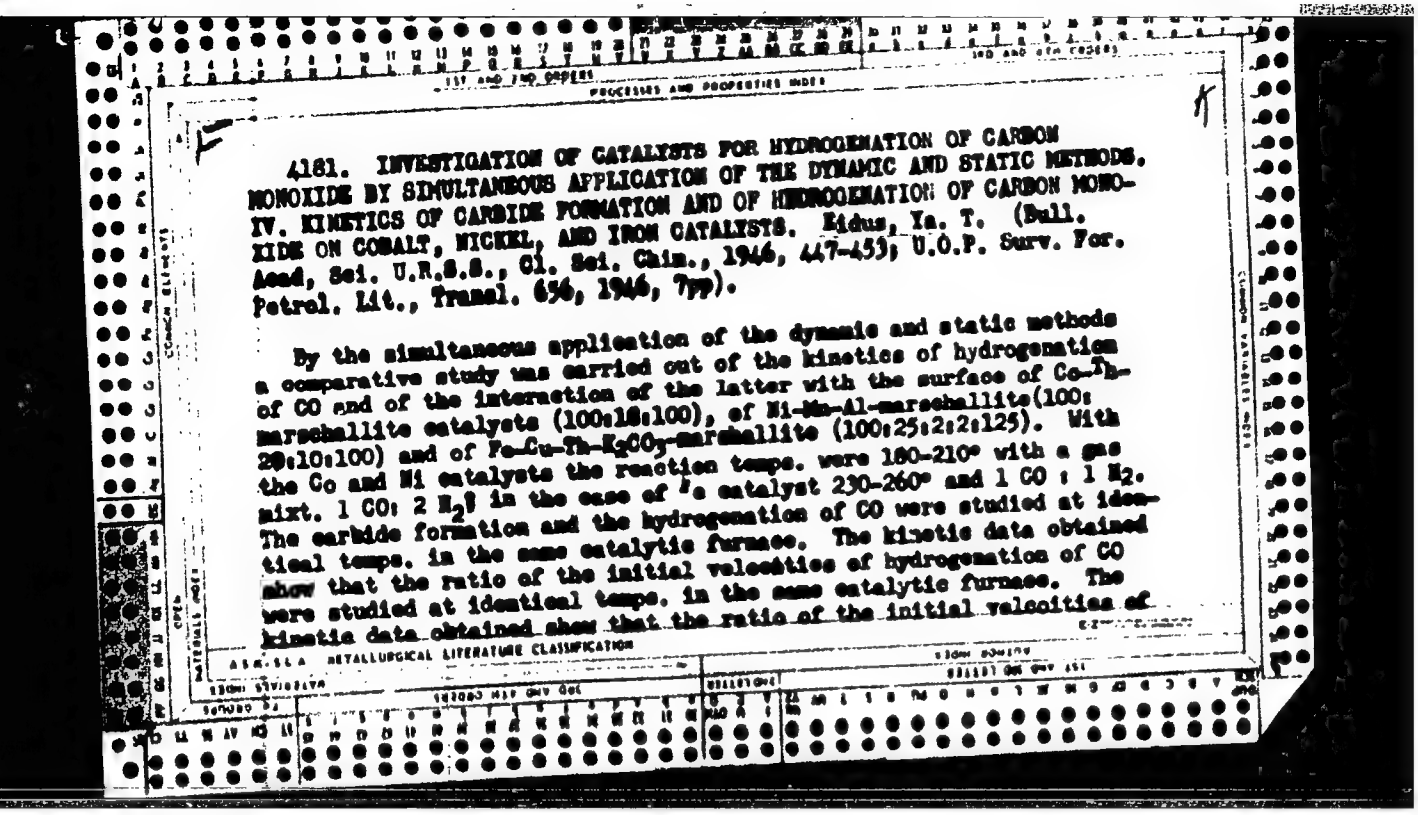
Role of the principle of conservation of the valency angle in the multiplet theory of catalysis. A. A. Balandin and J. T. Eklus (*Compt. rend. Acad. Sci. U.R.S.S.*, 1948, 60, 633—638).—It is shown that the principle of conservation of the valency angle is a highly important factor during the adsorption of a reacting mol. on a catalyst to form an intermediate multiplet complex, in every way similar to a stable mol. except for instability in the direction of the reaction co-ordinate. Thus, internuclear distances of the catalyst must be related to the dimensions of the adsorbed mol. in order that there may be min. stress in the multiplet complex. Optimum internuclear distances may be calc. by applying the principle of conservation of the valency angle. The different activities of the (110) and (111) planes of Ni in catalysing the hydrogenation of olefines confirm the result of a calculation of the optimum internuclear distance based on the above theory. H. R. C.

ASTIA METALLURGICAL LITERATURE CLASSIFICATION



Investigation of catalysts for the hydrogenation of carbon monoxide with joint application of the dynamic and the static methods. IV. Comparative study of the kinetics of carbide formation and the hydrogenation of carbon monoxide on cobalt, nickel and iron catalysts. Ya. T. Eidus. *Izvest. Akad. Nauk, Otdel. Khim. Nauk* - No. 4 1947, 397-420; *Chem. Zentr.* 1947, I, 1000; cf. *C.A.* 39, 4789.—The reactions taking place on Co-ThO_2 (100:18), Ni-Mn-Al_2O_3 (100:20:10), and Fe-Cu-ThO_2-K_2CO_3 catalysts were studied. The catalysts were deposited on kieselguhr in a 1:1 ratio. From the kinetic data obtained at 200-20° with the Fe catalysts, it is inferred that the ratio of the rate of carbide formation to the rate of hydrogenation of the CO is that of the rate of the slowest of the series of reactions to the rate of the total reaction. This agrees with the carbide theory of the formation of hydrocarbons from CO-H_2 mixts. With the Co and Ni catalysts the hydrogenation reaction ($2\ CO + H_2 \rightarrow CO_2 + CH_2 \rightarrow (CH_2)_x$) took place much faster than the carbide formation ($2\ CO \rightarrow CO_2 +$ carbide C). This substantiated the earlier view of E. that the reaction mechanism with the Co and Ni catalysts deviated from that with Fe catalysts.

M. G. Moore



4181. INVESTIGATION OF CATALYSTS FOR HYDROGENATION OF CARBON MONOXIDE BY SIMULTANEOUS APPLICATION OF THE DYNAMIC AND STATIC METHODS. IV. KINETICS OF CARBIDE FORMATION AND OF HYDROGENATION OF CARBON MONOXIDE ON COBALT, NICKEL, AND IRON CATALYSTS. Kidus, Ya. T. (Bull. Acad. Sci. U.R.S.S., Cl. Sci. Chim., 1946, 447-453; U.O.P. Surv. For. Petrol. Lit., Transl. 656, 1946, 7pp).

By the simultaneous application of the dynamic and static methods a comparative study was carried out of the kinetics of hydrogenation of CO and of the interaction of the latter with the surface of Co-Th-marschallite catalysts (100:18:100), of Ni-Mn-Al-marschallite(100: 20:10:100) and of Fe-Cu-Th-K_2CO_3-marschallite (100:25:2:2:125). With the Co and Ni catalysts the reaction temps. were 180-210° with a gas mixt. 1 CO: 2 H_2; in the case of Fe catalyst 230-260° and 1 CO : 1 H_2. The carbide formation and the hydrogenation of CO were studied at identical temps. in the same catalytic furnace. The kinetic data obtained show that the ratio of the initial velocities of hydrogenation of CO were studied at identical temps. in the same catalytic furnace. The kinetic data obtained show that the ratio of the initial velocities of

hydrogenation of CO to the carbide formation is much lower in the case of the Fe catalyst than for the Co and Ni catalysts. The lower ratio for the Fe catalyst results from the reduced hydrogenation velocity of CO on this catalyst as compared with the velocity of this process on the Co and Ni catalysts. This is in agreement with the carbide theory of synthesis of hydrocarbons from CO and H_2. On Co and Ni catalysts the rate of hydrogenations of CO materially exceeds that of interaction of CO with the catalyst, which contradicts the carbide theory of catalytic synthesis of hydrocarbons from CO and H_2 on these catalysts. If formation of liquid and solid hydrocarbons by hydrogenation of CO involves the carbide mechanism.

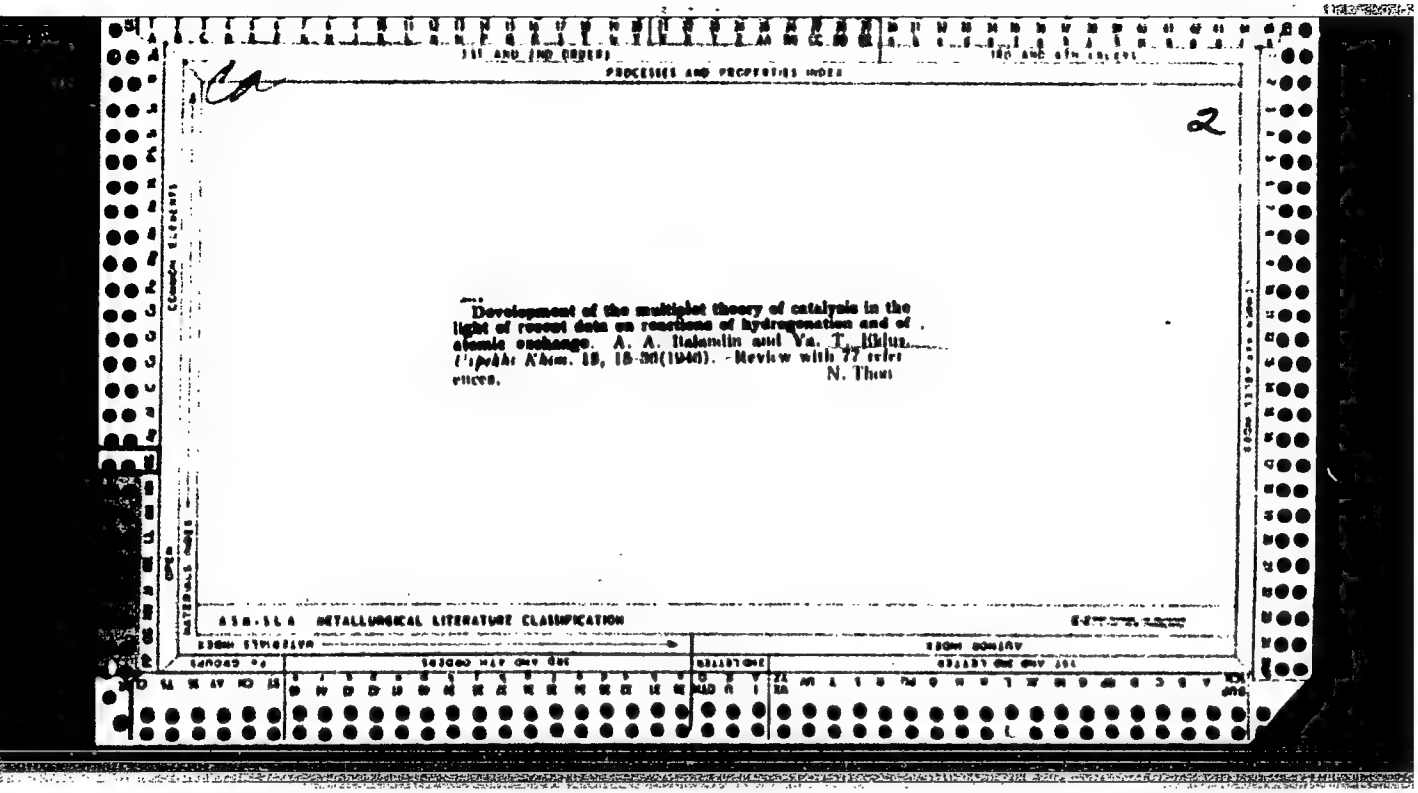
1) $2CO \longrightarrow Co_2 + C$ (carbide) (a)

2) C (carbide) $+ H_2 \longrightarrow CH_2$ (b)

$2CO + H_2 \longrightarrow CO_2 + CH_2$ (c)

$(CH_2)n$

then the conclusion can be drawn from the exptl data obtained that equality of the reaction velocities of (a) and (c) is in accord with the carbide theory only in the case of Fe catalysts; for the Co and Ni catalysts the velocity of the process is considerably in excess of that in the process (a). All this speaks against the applicability of the carbide formation mechanism for the explanation of the chemical process occurring on the Co and Ni catalysts and in favour of the mechanism of synthesis of hydrocarbons from CO and H_2 in the case of Fe catalysts. This is also supported by data previously reported by the author.

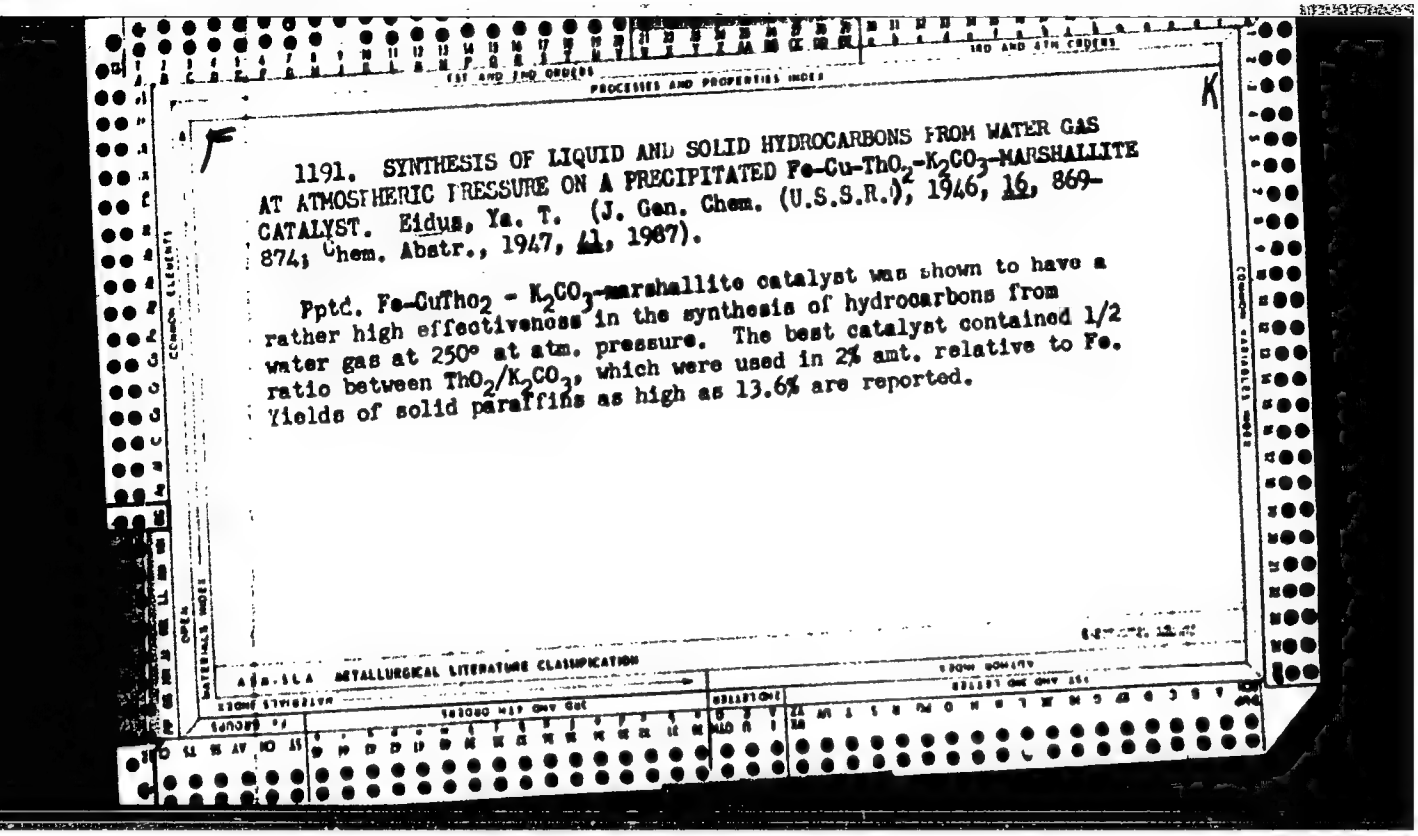


PROCESSES AND PROPERTIES INDEX

2

Development of the multiplet theory of catalysis in the light of recent data on reactions of hydrogenation and of atomic exchange. A. A. Balandin and Va. T. Kliuz. Uspekhi Khim. 10, 10-30(1940). - Review with 77 references. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



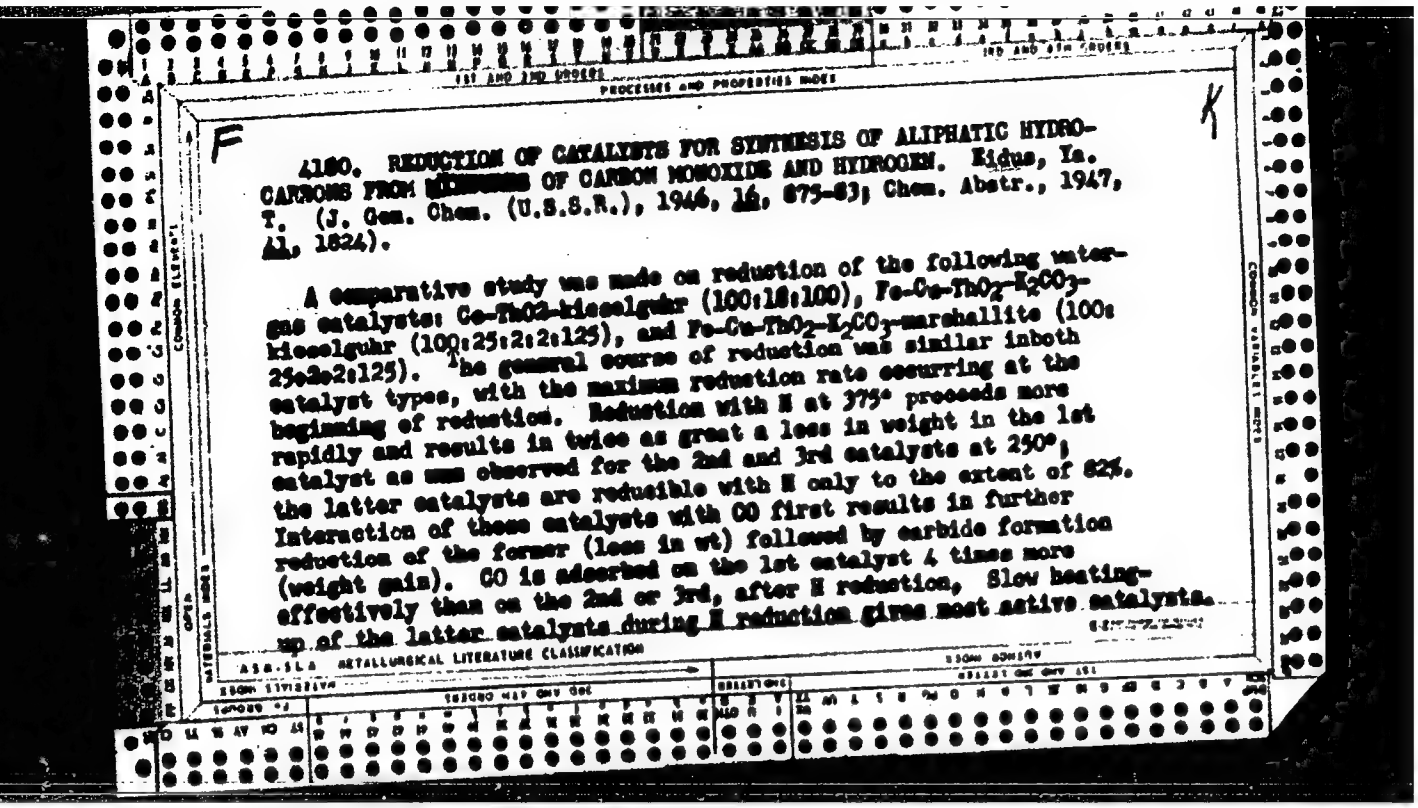
PROCESSES AND PROPERTIES INDEX

F K

1191. SYNTHESIS OF LIQUID AND SOLID HYDROCARBONS FROM WATER GAS AT ATMOSPHERIC PRESSURE ON A PRECIPITATED Fe-Cu-ThO_2-K_2CO_3-MARSHALLITE CATALYST. Eidus, Ya. T. (J. Gen. Chem. (U.S.S.R.), 1946, 16, 869-874; Chem. Abstr., 1947, 41, 1987).

Pptd. Fe-CuThO_2 - K_2CO_3-marshallite catalyst was shown to have a rather high effectiveness in the synthesis of hydrocarbons from water gas at 250° at atm. pressure. The best catalyst contained 1/2 ratio between ThO_2/K_2CO_3, which were used in 2% amt. relative to Fe. Yields of solid paraffins as high as 13.6% are reported.

A 1.5.1.A METALLURGICAL LITERATURE CLASSIFICATION



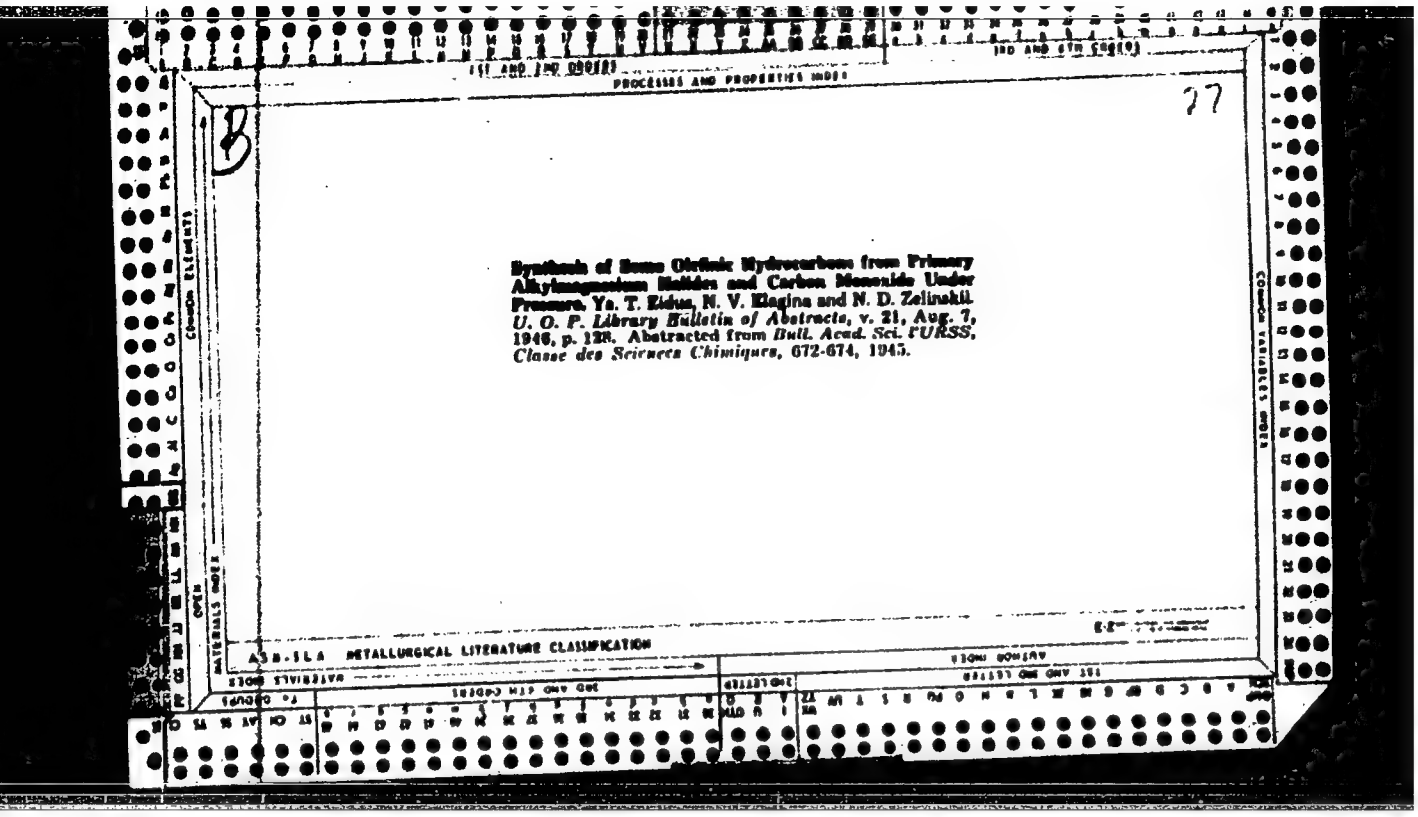
F

4180. REDUCTION OF CATALYSTS FOR SYNTHESIS OF ALIPHATIC HYDRO-CARBONS FROM [redacted] OF CARBON MONOXIDE AND HYDROGEN. Kidus, Ia. T. (J. Gen. Chem. (U.S.S.R.), 1946, 16, 875-83; Chem. Abstr., 1947, 41, 1824).

A comparative study was made on reduction of the following water-gas catalysts: Co-ThO_2-kieselguhr (100:18:100), Fe-Cu-ThO_2-K_2CO_3-kieselguhr (100:25:2:2:125), and Fe-Cu-ThO_2-K_2CO_3-marshallite (100:25:2:2:125). The general course of reduction was similar in both catalyst types, with the maximum reduction rate occurring at the beginning of reduction. Reduction with H at 375° proceeds more rapidly and results in twice as great a loss in weight in the 1st catalyst as was observed for the 2nd and 3rd catalysts at 250°; the latter catalysts are reducible with H only to the extent of 82%. Interaction of these catalysts with CO first results in further reduction of the former (loss in wt) followed by carbide formation (weight gain). CO is adsorbed on the 1st catalyst 4 times more effectively than on the 2nd or 3rd, after H reduction. Slow heating-up of the latter catalysts during H reduction gives most active catalysts.

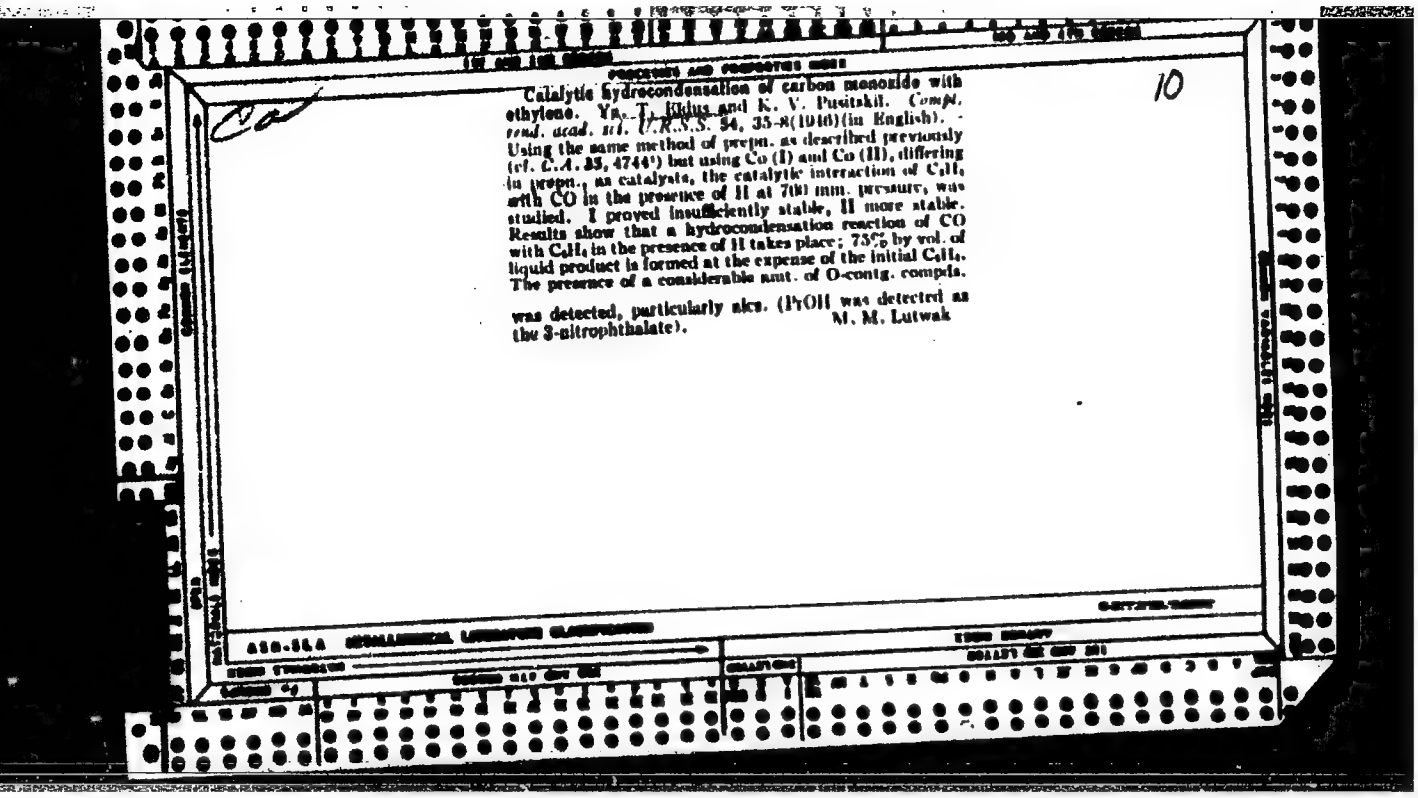
K

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

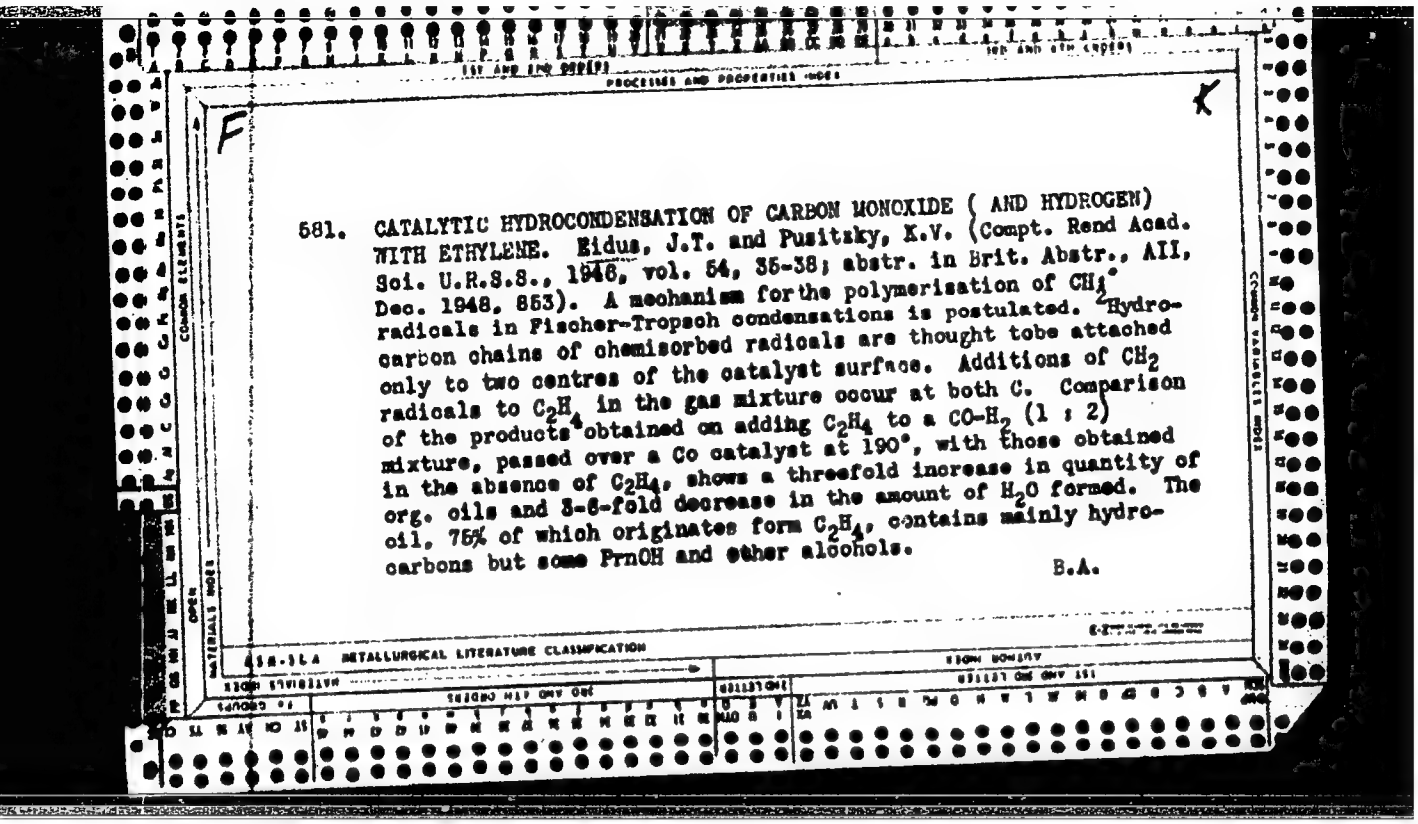


77

Synthesis of Some Olefinic Hydrocarbons from Primary Alkylmagnesium Halides and Carbon Monoxide Under Pressure. Ya. T. Eidus, N. V. Klagina and N. D. Zelinskii. *U. O. P. Library Bulletin of Abstracts*, v. 21, Aug. 7, 1946, p. 12R. Abstracted from *Bull. Acad. Sci. URSS, Classe des Sciences Chimiques*, 672-674, 1945.



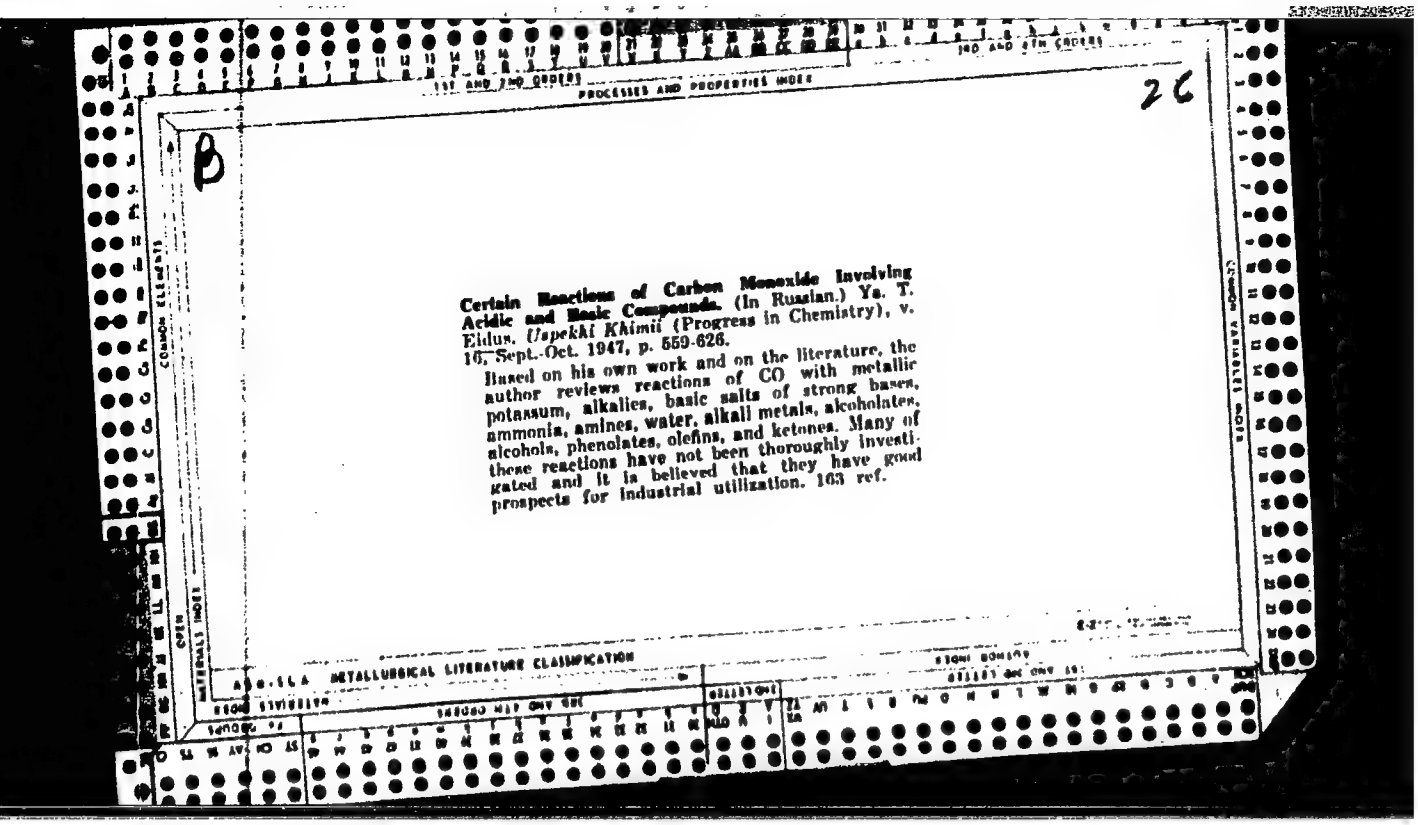
Catalytic hydrocondensation of carbon monoxide with ethylene. Ya. T. Eidus and K. V. Puzitskii. *Compt. rend. acad. sci. U.R.S.S.* 54, 35-8(1946)(in English). - Using the same method of prepn. as described previously (cf. *C.A.* 35, 4744[1]) but using Co (I) and Co (II), differing in prepn., as catalysts, the catalytic interaction of C_2H_4 with CO in the presence of H at 700 mm. pressure, was studied. I proved insufficiently stable, II more stable. Results show that a hydrocondensation reaction of CO with C_2H_4 in the presence of H takes place; 75% by vol. of liquid product is formed at the expense of the initial C_2H_4. The presence of a considerable amt. of O-contg. compds. was detected, particularly alcs. ($PrOH$ was detected as the 3-nitrophthalate). M. M. Lutwak



F

581. CATALYTIC HYDROCONDENSATION OF CARBON MONOXIDE (AND HYDROGEN) WITH ETHYLENE. Eidus, J.T. and Pusitsky, K.V. (Compt. Rend Acad. Sci. U.R.S.S., 1946, vol. 54, 35-38; abstr. in Brit. Abstr., AII, Dec. 1948, 863). A mechanism for the polymerisation of CH_2 radicals in Fischer-Tropsch condensations is postulated. Hydrocarbon chains of chemisorbed radicals are thought tobe attached only to two centres of the catalyst surface. Additions of CH_2 radicals to C_2H_4 in the gas mixture occur at both C. Comparison of the products obtained on adding C_2H_4 to a $CO-H_2$ (1 : 2) mixture, passed over a Co catalyst at 190°, with those obtained in the absence of C_2H_4, shows a threefold increase in quantity of org. oils and 3-6-fold decrease in the amount of H_2O formed. The oil, 75% of which originates form C_2H_4, contains mainly hydrocarbons but some PrnOH and other alcohols.

B.A.



Certain Reactions of Carbon Monoxide Involving Acidic and Basic Compounds. (In Russian.) Ya. T. Eidus. *Uspekhi Khimii* (Progress in Chemistry), v. 16, Sept.-Oct. 1947, p. 559-626.

Based on his own work and on the literature, the author reviews reactions of CO with metallic potassium, alkalies, basic salts of strong bases, ammonia, amines, water, alkali metals, alcoholates, alcohols, phenolates, olefins, and ketones. Many of these reactions have not been thoroughly investigated and it is believed that they have good prospects for industrial utilization. 163 ref.

EYDUS, YA. T. PA-77T1

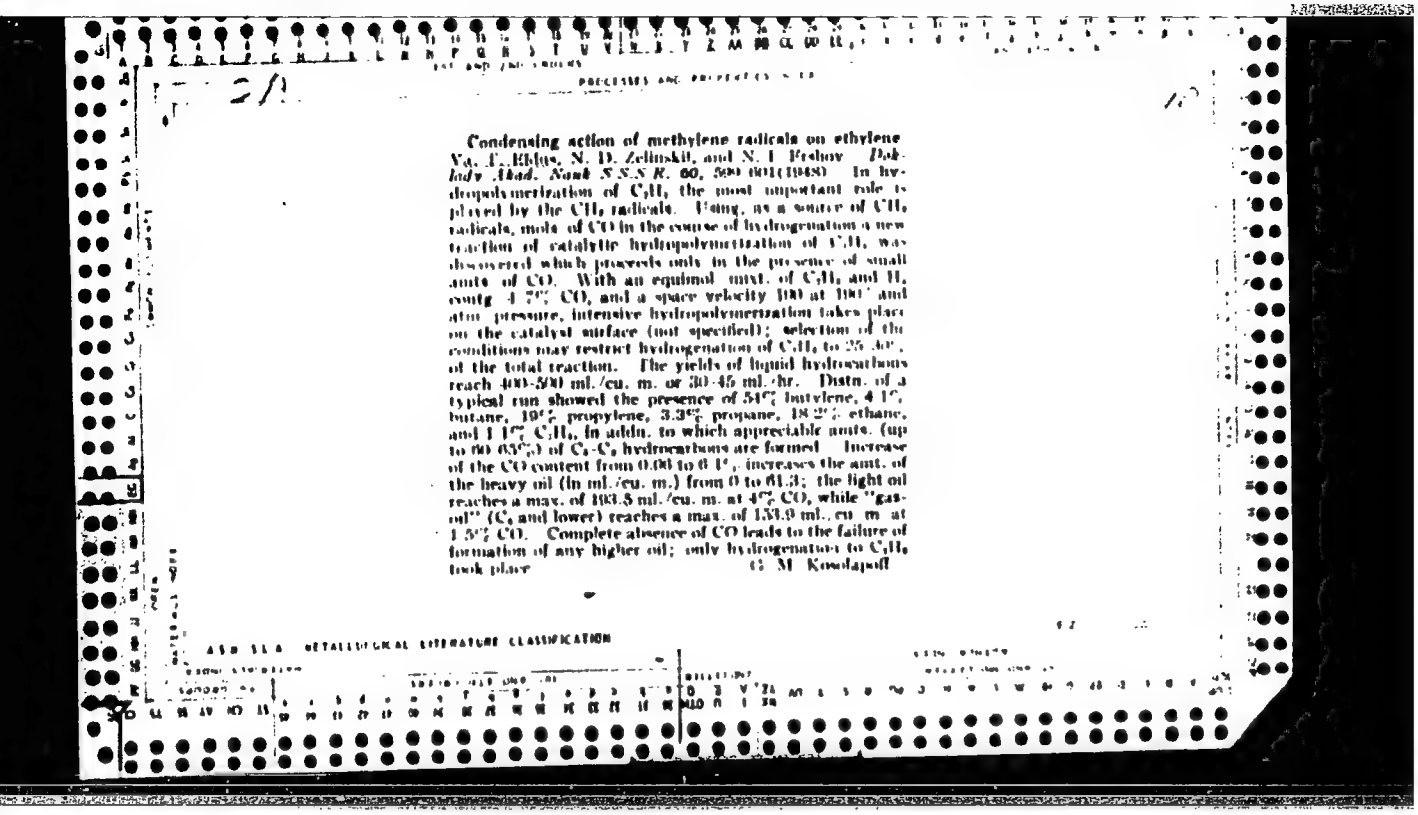
USSR/Chemistry - Ethylene, Polymerization May 1948
With Methylene Radicals
Chemistry - Polymerization, Catalysts for

"On the Condensation Action of Methylene Radicals on Ethylene," Ya. T. Eydus, Acad N. D. Zelinskiy, N. I. Ershov, 3 pp

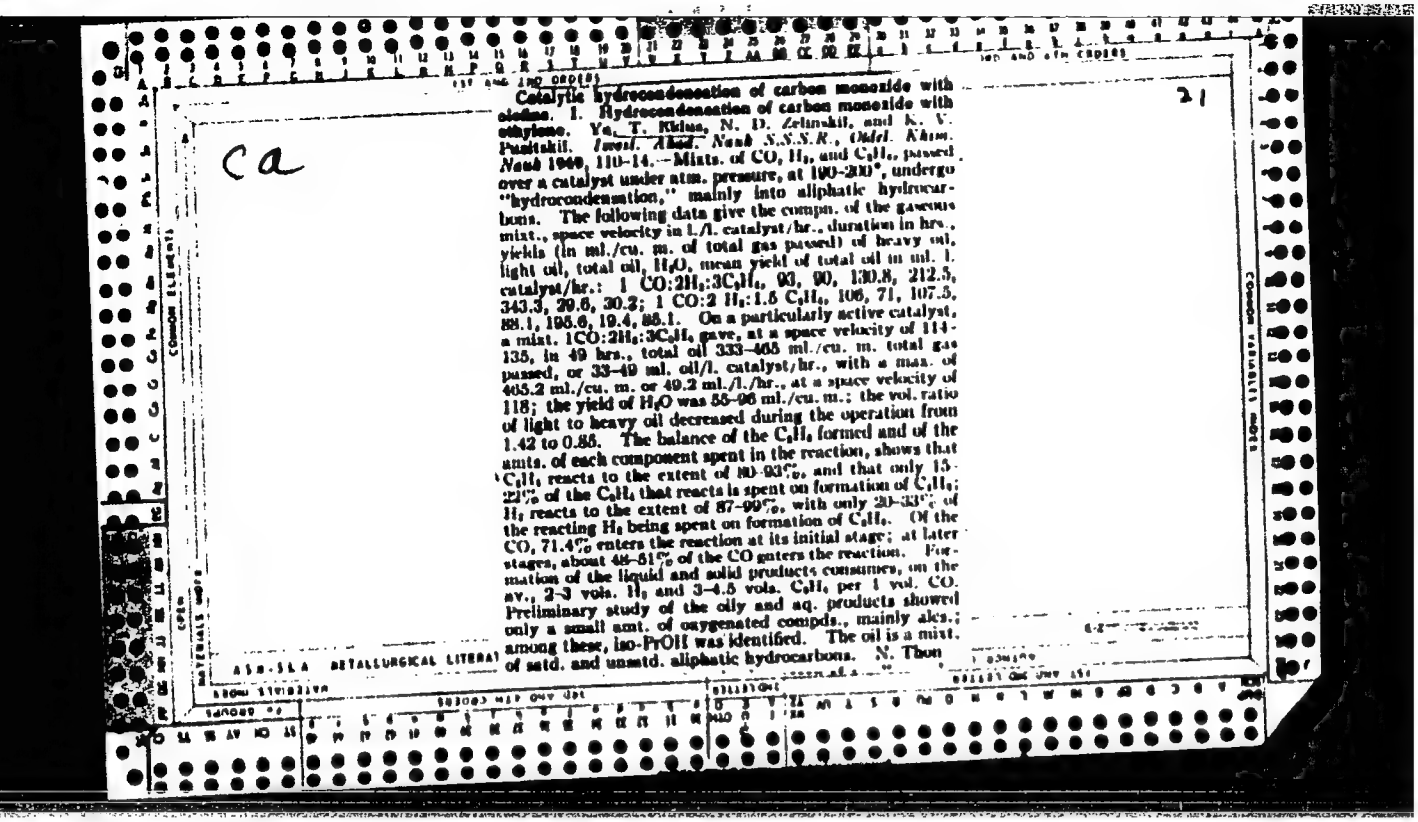
"Dok Ak Nauk SSSR" Vol LX, No 4

Report of experiments on above subject, which led to discovery of new catalytic hydropolymerization of ethylene in presence of small quantities of carbon monoxide. Submitted 10 Mar 1948.

77T1



Condensing action of methylene radicals on ethylene Va. T. Ilkin, N. D. Zelinskii, and N. I. Prokov *Doklady Akad. Nauk S.S.S.R.* 60, 589-601(1948). In hydropolymerization of C_2H_4, the most important role is played by the CH_2 radicals. Using, as a source of CH_2 radicals, mols. of CO in the course of hydrogenation a new reaction of catalytic hydropolymerization of C_2H_4 was discovered which proceeds only in the presence of small amts. of CO. With an equimol mixt. of C_2H_4 and H_2, contg. 4.7% CO, and a space velocity 100 at 100° and atm. pressure, intensive hydropolymerization takes place on the catalyst surface (not specified); selection of the conditions may restrict hydrogenation of C_2H_4 to 25-30% of the total reaction. The yields of liquid hydrocarbons reach 400-500 ml./cu. m. or 30-45 ml./hr. Distn. of a typical run showed the presence of 51% butylene, 4.1% butane, 19% propylene, 3.3% propane, 18.2% ethane, and 1.1% C_2H_2, in addn. to which appreciable amts. (up to 60-65%) of C_5-C_8 hydrocarbons are formed. Increase of the CO content from 0.00 to 0.1%, increases the amt. of the heavy oil (in ml./cu. m.) from 0 to 61.3; the light oil reaches a max. of 193.5 ml./cu. m. at 4% CO, while "gas-oil" (C_4 and lower) reaches a max. of 153.9 ml./cu. m. at 1.5% CO. Complete absence of CO leads to the failure of formation of any higher oil; only hydrogenation to C_2H_6 took place. G. M. Kondakoff



Catalytic hydrocondensation of carbon monoxide with olefins. I. Hydrocondensation of carbon monoxide with ethylene. Ya. T. Eidus, N. D. Zelinskii, and K. V. Puzitskii. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1940, 119–14.—Mixts. of CO, H_2, and C_2H_4, passed over a catalyst under atm. pressure, at 190–200°, undergo "hydrocondensation," mainly into aliphatic hydrocarbons. The following data give the compn. of the gaseous mixt., space velocity in l./l. catalyst/hr., duration in hrs., yields (in ml./cu. m. of total gas passed) of heavy oil, light oil, total oil, H_2O, mean yield of total oil in ml. l. catalyst/hr.: 1 CO:$2H_2$:$3C_2H_4$, 93, 90, 130.8, 212.5, 343.3, 29.6, 30.2; 1 CO:2 H_2:1.5 C_2H_4, 106, 71, 107.5, 88.1, 195.6, 19.4, 85.1. On a particularly active catalyst, a mixt. 1CO:$2H_2$:$3C_2H_4$ gave, at a space velocity of 114–135, in 49 hrs., total oil 333–465 ml./cu. m. total gas passed, or 33–49 ml. oil/l. catalyst/hr., with a max. of 465.2 ml./cu. m. or 49.2 ml./l./hr., at a space velocity of 118; the yield of H_2O was 55–96 ml./cu. m.; the vol. ratio of light to heavy oil decreased during the operation from 1.42 to 0.85. The balance of the C_2H_4 formed and of the amts. of each component spent in the reaction, shows that C_2H_4 reacts to the extent of 80–93%, and that only 15–20% of the C_2H_4 that reacts is spent on formation of C_3H_6; H_2 reacts to the extent of 87–99%, with only 20–33% of the reacting H_2 being spent on formation of C_3H_6. Of the CO, 71.4% enters the reaction at its initial stage; at later stages, about 48–51% of the CO enters the reaction. Formation of the liquid and solid products consumes, on the av., 2–3 vols. H_2 and 3–4.5 vols. C_2H_4 per 1 vol. CO. Preliminary study of the oily and aq. products showed only a small amt. of oxygenated compds., mainly alcs.; among these, iso-PrOH was identified. The oil is a mixt. of satd. and unsatd. aliphatic hydrocarbons. N. Thon

EYDUS, YA. T.

USSR/Chemistry - Hydrocarbons, Liquid
Chemistry - Condensation Compounds

May/Jun 49

"Catalytic Hydrocondensation of Carbon Monoxide with Olefines: No. II, Investigation of the Liquid Products of the Condensation of Carbon Monoxide with Ethylene," Ya. T. Eydus, N. D. Zelenskiy, K. V. Puzitskiy, Inst. of Org. Chem., Acad. Sci., USSR, 7 pp.

"Iz. Ak. Nauk SSSR, Otdel Khim Nauk" No. 3

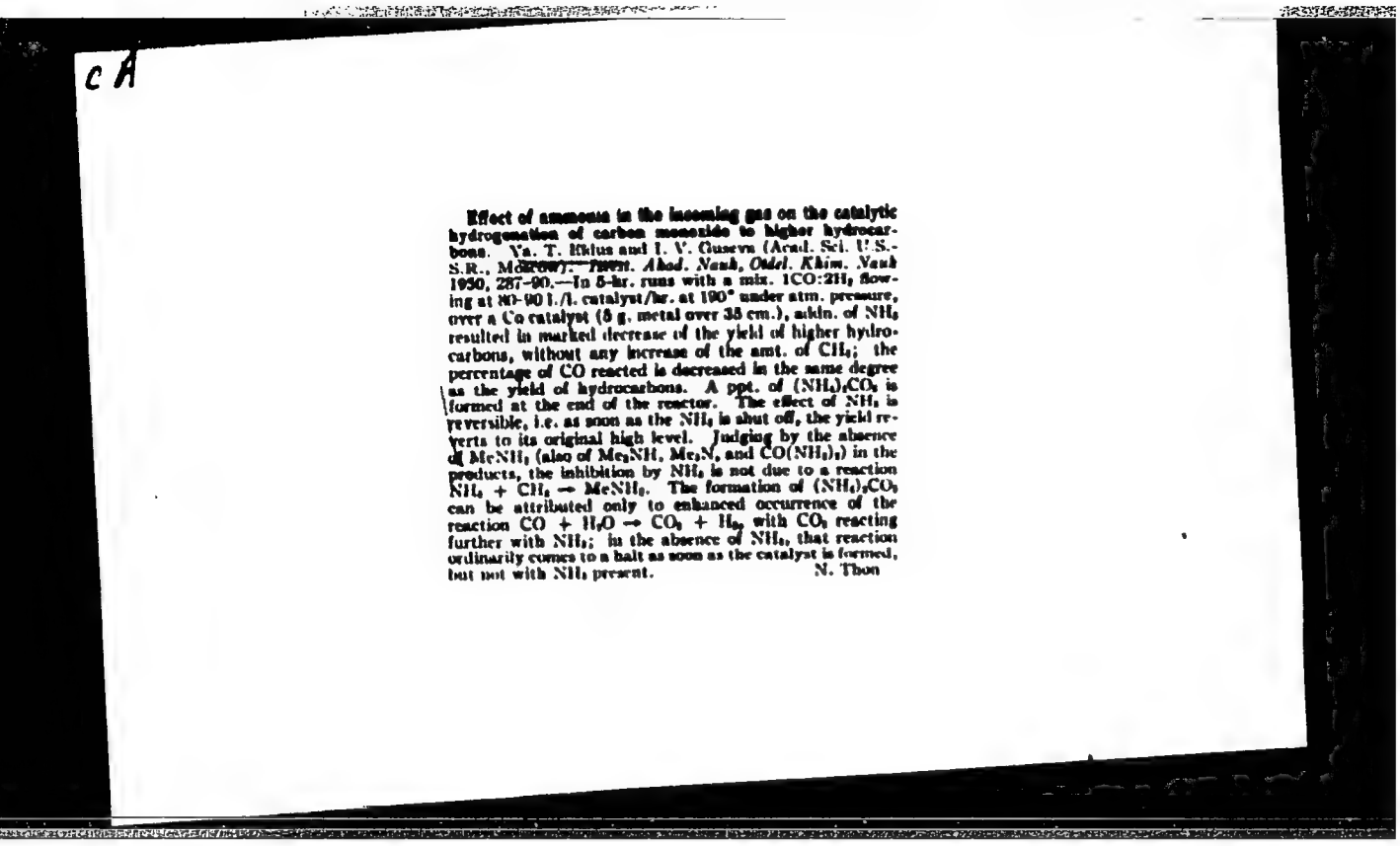
Subject products are chiefly propanol, propionic aldehyde, propionic acid, and aliphatic saturated and unsaturated hydrocarbons. Formation of the hydrocarbons is effected by the methylene radical. Submitted 12 Mar 48.

56/49T19

EYDUS, Y a,

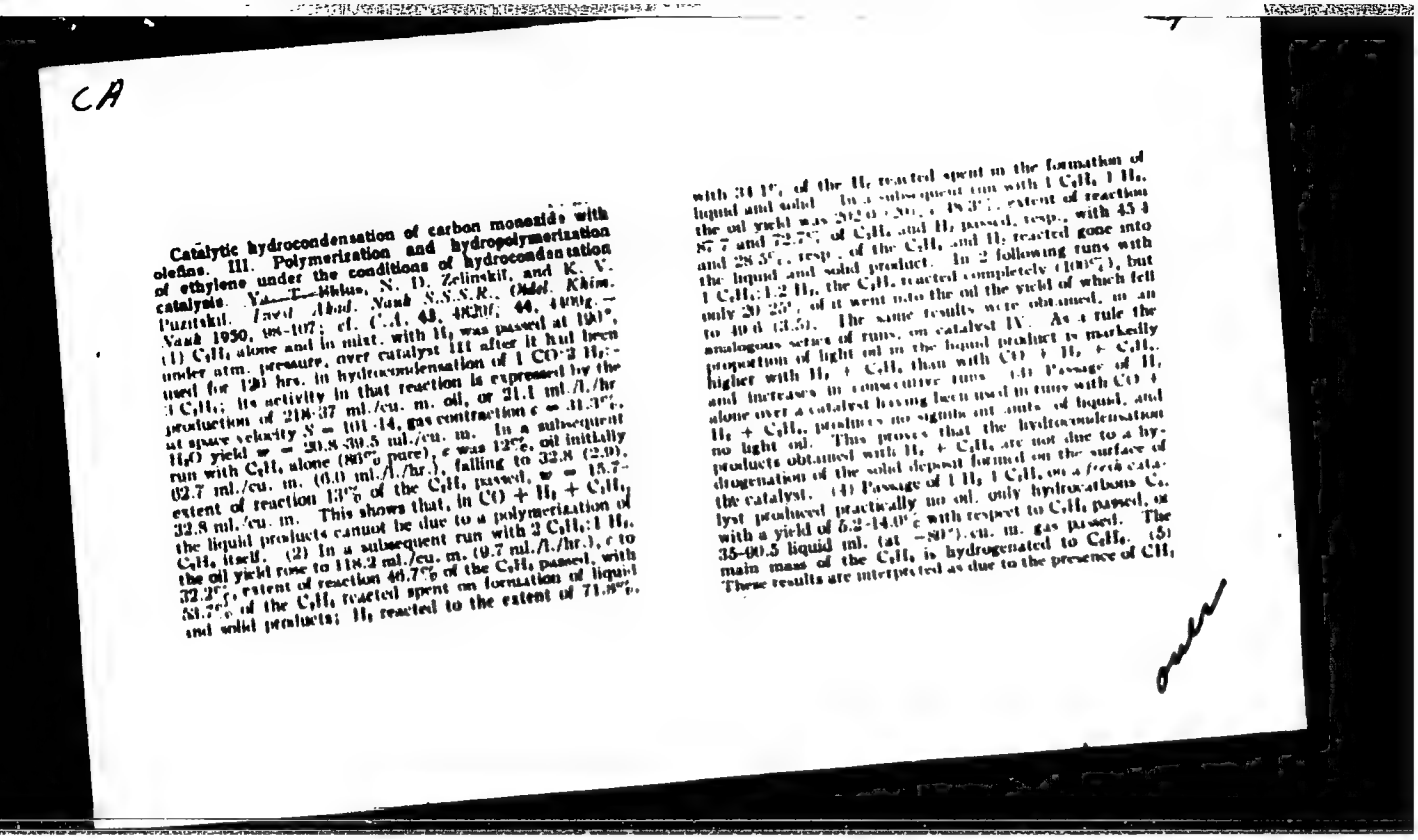
29924 Spektpy Pogdoshcheni Ya 2-nitroindanoiona-1 s b Ul' traftodetovoy Oblasti. Izuestiya Akad. Nauk Latv. SSR, 1949 No. 8, s. 21-4 O-Na Latyts. Yaz. Rezyume Ne Rus. Yaz. Bibliogr: 12 Nazv.

SO: Letopis' Zhurnal'nykh Statey, Vol. 39, Moskva, 1949



CA

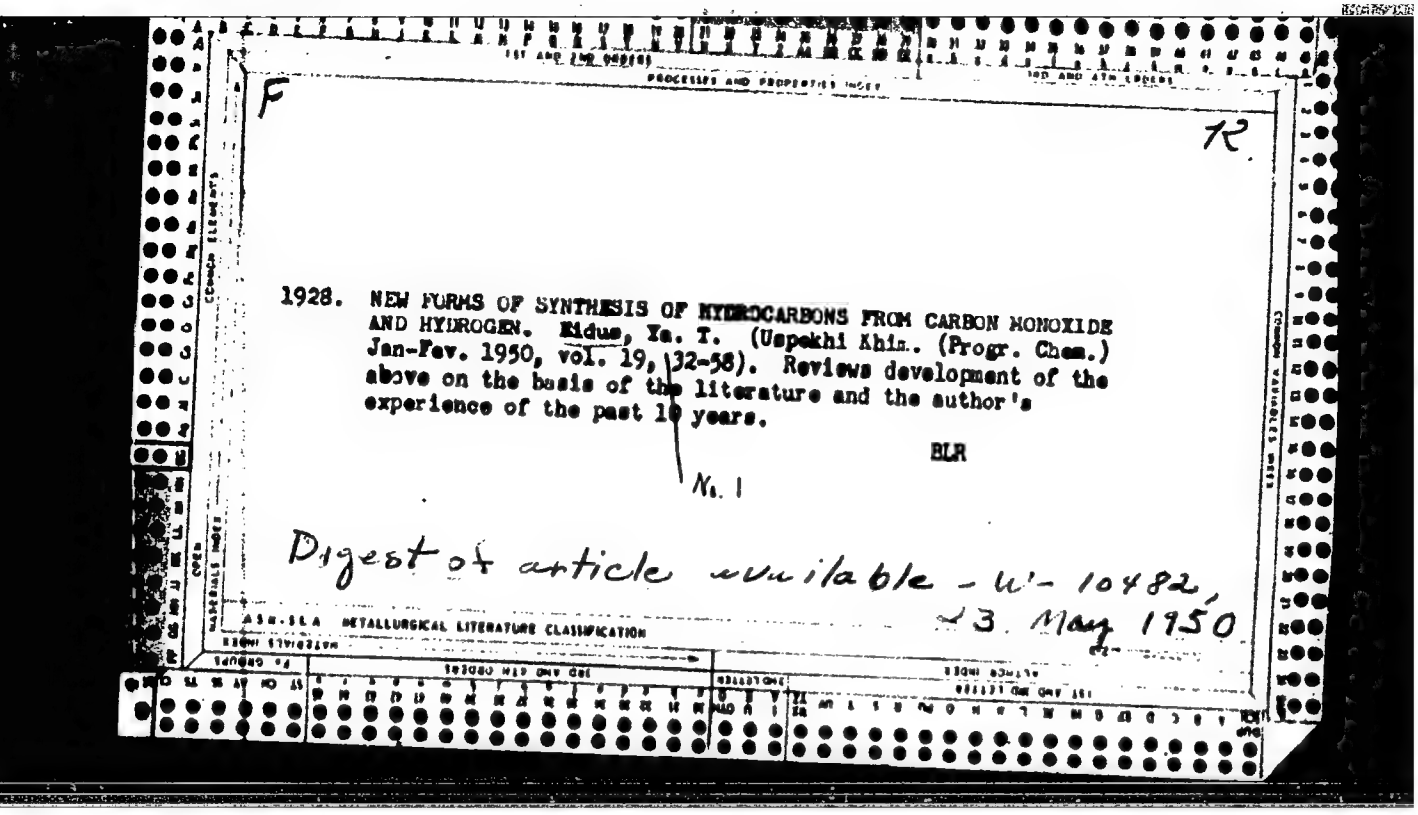
Effect of ammonia in the incoming gas on the catalytic hydrogenation of carbon monoxide to higher hydrocarbons. Ya. T. Eidus and I. V. Guseva (Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk, Otdel. Khim. Nauk* 1950, 287–90.—In 5-hr. runs with a mix. $1CO:2H_2$ flowing at 80–90 l./l. catalyst/hr. at 190° under atm. pressure, over a Co catalyst (5 g. metal over 35 cm.), addn. of NH_3 resulted in marked decrease of the yield of higher hydrocarbons, without any increase of the amt. of CH_4; the percentage of CO reacted is decreased in the same degree as the yield of hydrocarbons. A ppt. of $(NH_4)_2CO_3$ is formed at the end of the reactor. The effect of NH_3 is reversible, i.e. as soon as the NH_3 is shut off, the yield reverts to its original high level. Judging by the absence of $MeNH_2$ (also of Me_2NH, Me_3N, and $CO(NH_2)_2$) in the products, the inhibition by NH_3 is not due to a reaction $NH_3 + CH_4 \rightarrow MeNH_2$. The formation of $(NH_4)_2CO_3$ can be attributed only to enhanced occurrence of the reaction $CO + H_2O \rightarrow CO_2 + H_2$, with CO_2 reacting further with NH_3; in the absence of NH_3, that reaction ordinarily comes to a halt as soon as the catalyst is formed, but not with NH_3 present. N. Thon



CA

Catalytic hydrocondensation of carbon monoxide with olefins. III. Polymerization and hydropolymerization of ethylene under the conditions of hydrocondensation catalysis. Ya. T. Eidus, N. D. Zelinskii, and K. V. Puzitskii. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1950, 98–107; cf. *C.A.* 43, 4830f, 44, 4400g.—(1) C_2H_4 alone and in mixt. with H_2 was passed at 190°, under atm. pressure, over catalyst III after it had been used for 120 hrs. in hydrocondensation of 1 CO:2 H_2:1 C_2H_4; its activity in that reaction is expressed by the production of 218.37 ml./cu. m. oil, or 21.1 ml./l./hr. at space velocity S = 101.14, gas contraction c = 31.3%, H_2O yield w = 30.8–30.5 ml./cu. m. In a subsequent run with C_2H_4 alone (80% pure), c was 12%, oil initially 92.7 ml./cu. m. (9.0 ml./l./hr.), falling to 32.8 (2.9), extent of reaction 13% of the C_2H_4 passed, w = 15.7–32.8 ml./cu. m. This shows that, in CO + H_2 + C_2H_4, the liquid products cannot be due to a polymerization of C_2H_4 itself. (2) In a subsequent run with 2 C_2H_4:1 H_2, the oil yield rose to 118.2 ml./cu. m. (9.7 ml./l./hr.), c to 32.2%, extent of reaction 46.7% of the C_2H_4 passed, with 58.2% of the C_2H_4 reacted spent on formation of liquid and solid products; H_2 reacted to the extent of 71.8%, with 34.1% of the H_2 reacted spent in the formation of liquid and solid. In a subsequent run with 1 C_2H_4, 1 H_2, the oil yield was 302.0 ml., c 48.3%, extent of reaction 87.7 and 72.7% of C_2H_4 and H_2 passed, resp., with 43.4 and 28.5%, resp., of the C_2H_4 and H_2 reacted gone into the liquid and solid product. In 2 following runs with 1 C_2H_4:1.2 H_2, the C_2H_4 reacted completely (100%), but only 20.25%, of it went into the oil the yield of which fell to 40.0 (3.5). The same results were obtained in an analogous series of runs, on catalyst IV. As a rule the proportion of light oil in the liquid product is markedly higher with H_2 + C_2H_4 than with CO + H_2 + C_2H_4, and increases in consecutive runs. (3) Passage of H_2 alone over a catalyst having been used in runs with CO + H_2 + C_2H_4, produces no signs of any of liquid, and no light oil. This proves that the hydrocondensation products obtained with H_2 + C_2H_4 are not due to a hydrogenation of the solid deposit formed on the surface of the catalyst. (4) Passage of 1 H_2:1 C_2H_4 on a fresh catalyst produced practically no oil, only hydrocarbons C_3, with a yield of 6.2–14.0% with respect to C_2H_4 passed, or 35–90.5 liquid ml. (at −80°)./cu. m. gas passed. The main mass of the C_2H_4 is hydrogenated to C_2H_6. (5) These results are interpreted as due to the presence of CH_2

radicals at certain points of the lattice of the metallic catalyst surface having been used with $CO + H_2$, $+ CH_4$. Wherever a CH_2 group happens to be located in a suitable position between the ends of two mols. of C_2H_4 absorbed on the same surface, it serves as a bridge linking the C_2H_4 mols. and leading to the formation of higher polymerization products. Such CH_2 groups being absent at the surface of a fresh catalyst, the probability of higher polymerization is very slight, and there can only be dimerization of adjacent C_2H_4 mols. into C_4 products. N. Thon



F

R

1928. NEW FORMS OF SYNTHESIS OF HYDROCARBONS FROM CARBON MONOXIDE AND HYDROGEN. Kidus, Ya. T. (Uspekhi Khim. (Progr. Chem.) Jan-Fev. 1950, vol. 19, 32-58). Reviews development of the above on the basis of the literature and the author's experience of the past 10 years.

BLR

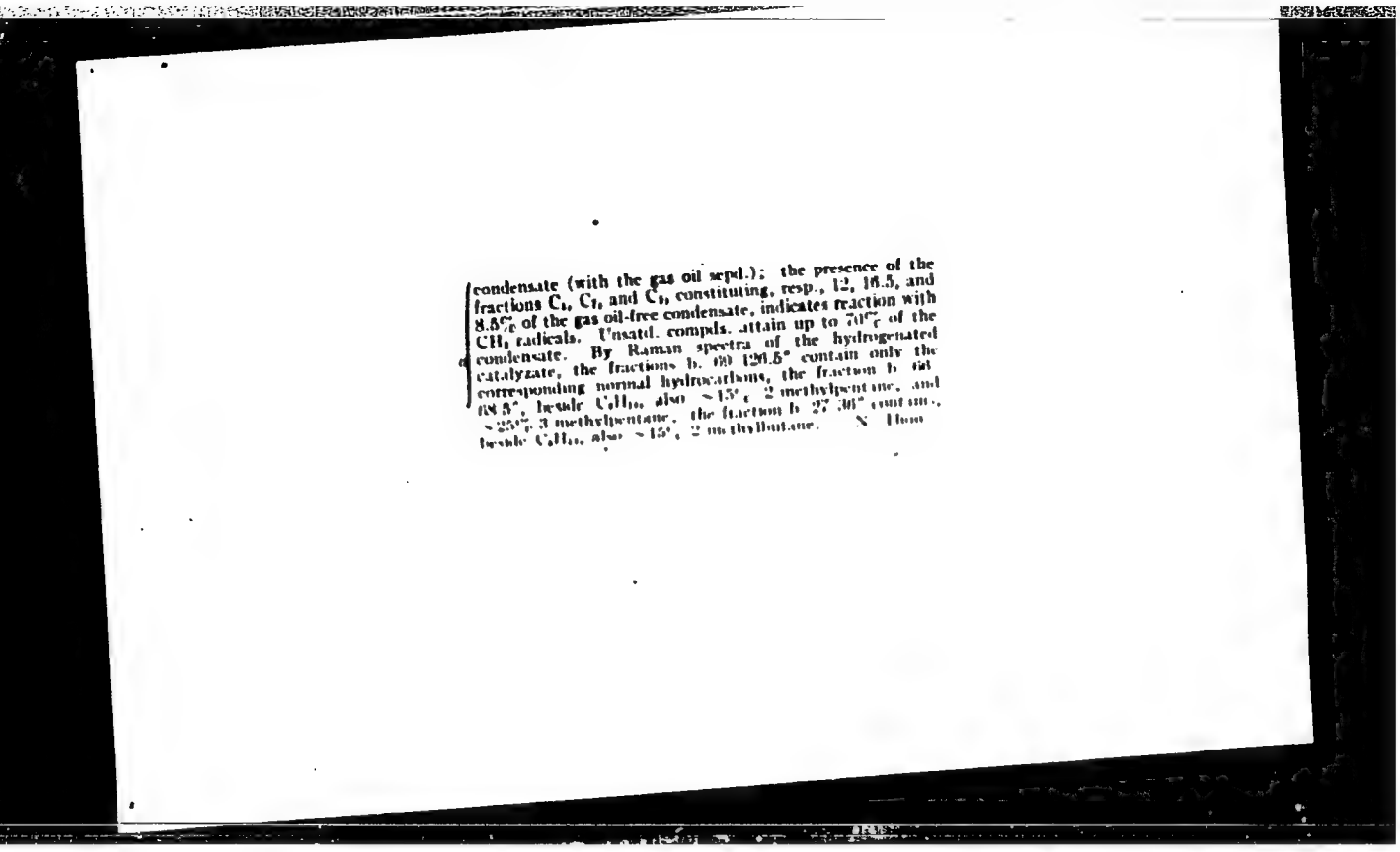
No. 1

Digest of article available - W- 10482, 23 May 1950

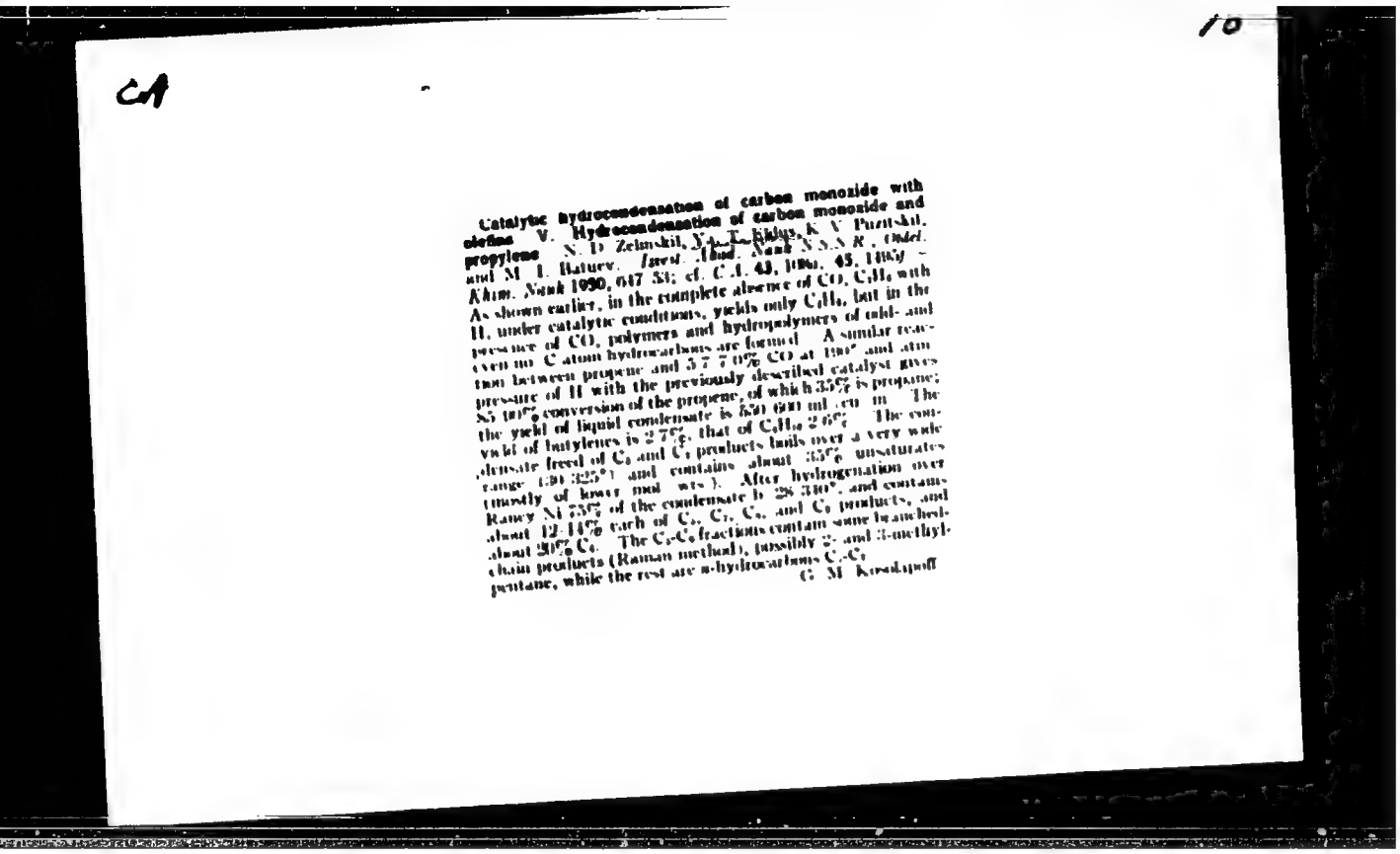
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

CA

Catalytic hydrocondensation of carbon monoxide with olefins. IV. Hydrocondensation of ethylene with carbon monoxide at low concentrations of the latter. Ya. T. Eidus, N. D. Zelinskii, N. I. Ershov, and M. I. Matuev (Inst. Org. Chem., Acad. Sci., U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1950, 377-85; cf. *C.A.* 44, 6100g. At 180°, under atm. pressure, mixts. of C_2H_4 + H_2 with small amts. of CO gave (with 3 different catalysts) the following yields (vol.-% C_2H_4, H_2, CO in the initial gas, space velocity, length of run in hrs., yield (ml./cu. m.) of heavy oil, light oil, gas oil, H_2O): 62.6, 37.5, 5.7, 104 l./l. catalyst/hr., 12.2 hrs., 86.3, 109.1, 285.4, 7.0; 48.9, 30.9, 7.0, 78, 47.0, 77.4, 224.8, 96.3, 31.3; 47.9, 38.5, 6.5, 85, 99.5, 38.7, 162.3, 100.4, 36.7. The compn. of the outgoing gas (vol.-%) in these 3 expts. was (C_2H_4, H_2, CO, C_2H_6, resp.): 2.4, 35.7, 0.8, 42.9; 19.1, 20.0, 9.7, 38.8; 12.8, 18.3, 8.0, 53.0 (balance N_2). The yield of liquid condensate (gas oil included) attains 30–45 ml./l. hr. C_2H_4 reacts to the extent of 77.7–98.5%, H_2 to 62.3–98.0%. CO is consumed mainly (up to 94.9%) in the beginning of the run, less at later stages. The fraction of the reacted C_2H_4 converted to C_3H_8 varies from 27.6 to 50.6%. At const. space velocity, for 1 l. catalyst/hr., with a gas mixt. contg. ~7% CO, the optimum temp., in the 180–250° range, is 180–210°. By fractionation of the products from an equimol. mixt. of C_2H_4 and H_2, contg. 4–7% CO, the gas oil constitutes about 30% of all org. products in the condensate, and consists (not including CH_4) of C_3H_8 1.1, C_4H_{10} 18.2, C_5H_{12} 19.0, C_6H_{14} 3.3, C_7H_{16} 5.4, C_8H_{18} 4.1 wt. %, or, in % of the org. matter in the condensate, resp., 0.35, 6.1, 6.3, 1.1, 18.1, 1.4%. More than half of the gas oil, 51 wt.-%, is the nonhydrogenated dimer of C_4H_8, namely C_8H_{16}; the hydrogenated dimer, C_8H_{18}, is 4.1% (with respect to the wt. of the condensate, C_8H_{18} is 18.1, C_8H_{16} 1.4%). The presence of a C_3H_8 + C_4H_{10} fraction (22.3% of the gas oil, 7.4% of the condensate), with a C_4H_{10}/C_3H_8 ratio of 0.2–0.3, indicates condensation of CH_3 radicals with C_3H_5. Fractions C_6 and C_9 (trimers and tetramers of C_3H_6) constitute, resp., 18.8 and 12.6% of the



condensate (with the gas oil sepd.); the presence of the fractions C_1, C_7 and C_9, constituting, resp., 12, 16.5, and 8.5% of the gas oil-free condensate, indicates fraction with CH_3 radicals. Unsatd. compds. attain up to 70% of the condensate. By Raman spectra of the hydrogenated catalyzate, the fractions b. 60 120.5° contain only the corresponding normal hydrocarbons, the fraction b. 68 68.5°, beside C_6H_{14} also ~15% 2 methylpentane, and ~25% 3 methylpentane, the fraction b. 27 30° contains, beside C_5H_{12}, also ~15% 2 methylbutane. N. Thon



CA

10

Catalytic hydrocondensation of carbon monoxide with olefins. V. Hydrocondensation of carbon monoxide and propylene. N. D. Zelinskii, Y. L. Bilitz, K. V. Puzitskii, and M. I. Ratuev. *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1930, 647-53; cf. *C.A.* **43**, 1986. **45**, 1869.—As shown earlier, in the complete absence of CO, C_3H_6 with H, under catalytic conditions, yields only C_6H_{12}, but in the presence of CO, polymers and hydropolymers of olefins and even no C atom hydrocarbons are formed. A similar reaction between propene and 57.7% CO at 100° and atm. pressure of H with the previously described catalyst gives 85.10% conversion of the propene, of which 35% is propane; the yield of liquid condensate is 520 gm. per cu. m. The yield of butylenes is 2.7%; that of C_5H_{10} 2.6%. The condensate freed of C_3 and C_4 products boils over a very wide range (30-325°) and contains about 35% unsaturates (mostly of lower mol. wts.). After hydrogenation over Raney Ni 75% of the condensate is 28-330°, and contains about 12-14% each of C_5, C_7, C_8, and C_9 products, and about 30% C_6. The C_5-C_9 fractions contain some branched-chain products (Raman method), possibly 2- and 3-methylpentane, while the rest are n-hydrocarbons C_5-C_9.

G. M. Kosolapoff

EYDUS, Ya. T.

USSR/Chemistry - Petroleum

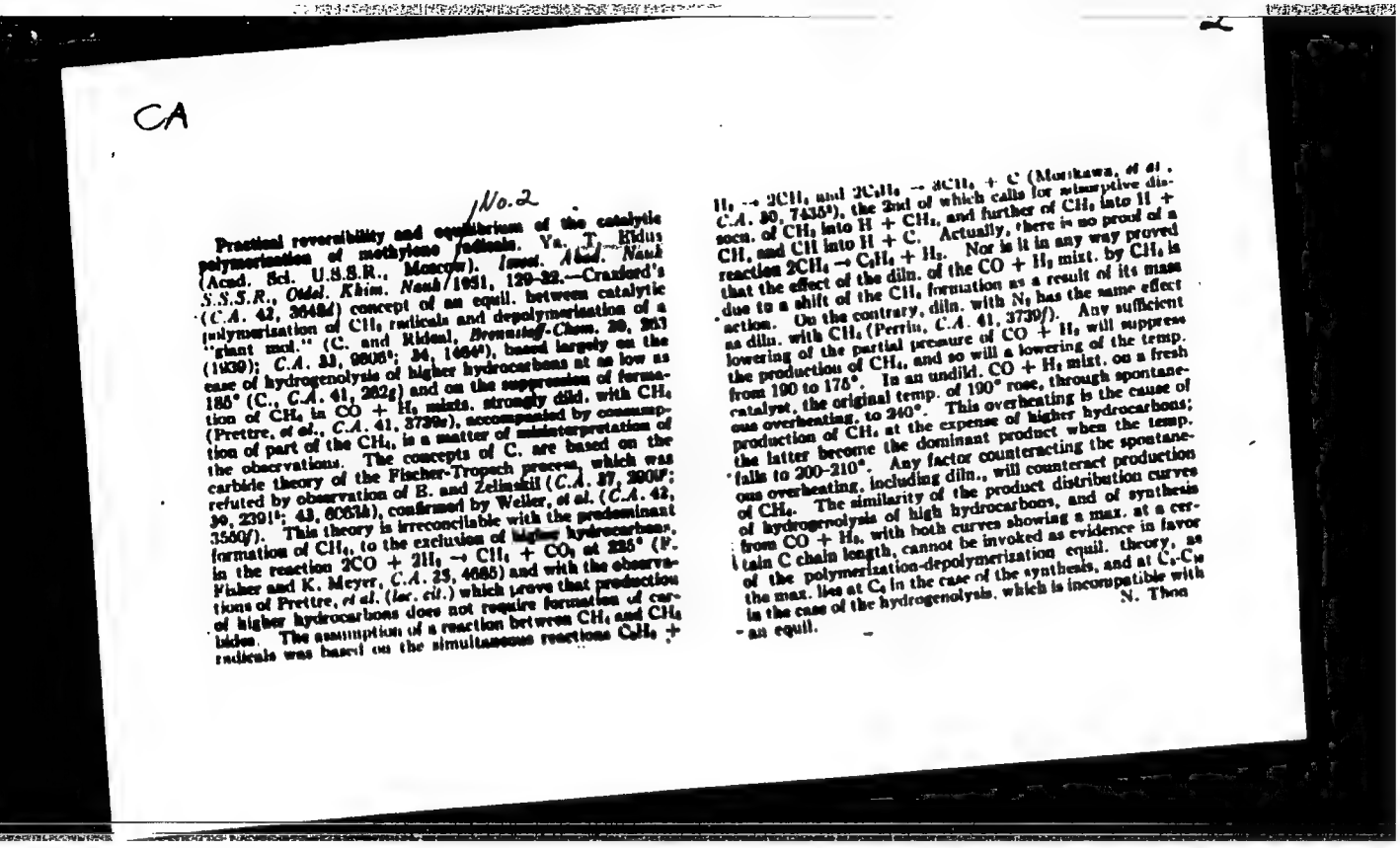
Mar/Apr 51

"On the Essential Reversibility and Equilibrium of the Catalytic Polymerization of Methylene Radicals," Ya. T. Eydus, Inst. Org. Chem., Acad. Sci., USSR.

"Iz. Ak. Nauk SSSR, Otdel Khim Nauk" No. 2, pp. 129-132.

Examined concept of equilibrium between (1) catalytic polymerization of methylene radicals and (2) depolymerization of resultant "giant mol" (according to -. R. Craxford). Found experimental data disprove, not support, this concept.

179T24



CA

No. 2

Practical reversibility and equilibrium of the catalytic polymerization of methylene radicals. Ya. T. Eidus (Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1951, 129–32.—Craxford's (*C.A.* 42, 3648*d*) concept of an equil. between catalytic polymerization of CH_2 radicals and depolymerization of a "giant mol." (C. and Rideal, *Brennstoff-Chem.* 20, 203 (1939); *C.A.* 33, 9806⁶; 34, 1464⁶), based largely on the ease of hydrogenolysis of higher hydrocarbons at as low as 185° (C., *C.A.* 41, 262*g*) and on the suppression of formation of CH_4 in CO + H_2 mixts. strongly dild. with CH_4 (Prettre, *et al.*, *C.A.* 41, 3739*a*), accompanied by consumption of part of the CH_4, is a matter of misinterpretation of the observations. The concepts of C. are based on the carbide theory of the Fischer-Tropsch process, which was refuted by observation of B. and Zelinskii (*C.A.* 37, 2900*f*; 39, 2391⁵; 43, 6065*h*), confirmed by Weller, *et al.* (*C.A.* 42, 3560*f*). This theory is irreconcilable with the predominant formation of CH_4, to the exclusion of higher hydrocarbons, in the reaction 2CO + $2H_2$ → CH_4 + CO_2 at 225° (F. Fisher and K. Meyer, *C.A.* 25, 4685) and with the observations of Prettre, *et al.* (*loc. cit.*) which prove that production of higher hydrocarbons does not require formation of carbides. The assumption of a reaction between CH_4 and CH_2 radicals was based on the simultaneous reactions C_2H_6 + H_2 → $2CH_4$ and $2C_2H_6$ → $3CH_4$ + C (Mashawa, *et al.*, *C.A.* 30, 7435⁹), the 2nd of which calls for simultaneous decom. of CH_2 into H + CH_2, and further of CH_2 into H + CH, and CH into H + C. Actually, there is no proof of a reaction $2CH_4$ → C_2H_6 + H_2. Nor is it in any way proved that the effect of the dilu. of the CO + H_2 mixt. by CH_4 is due to a shift of the CH_2 formation as a result of its mass action. On the contrary, dilu. with N_2 has the same effect as dilu. with CH_4 (Perrin, *C.A.* 41, 3739*f*). Any sufficient lowering of the partial pressure of CO + H_2 will suppress the production of CH_4, and so will a lowering of the temp. from 190 to 175°. In an undild. CO + H_2 mixt. on a fresh catalyst, the original temp. of 190° rose, through spontaneous overheating, to 240°. This overheating is the cause of production of CH_4 at the expense of higher hydrocarbons; the latter become the dominant product when the temp. falls to 200–210°. Any factor counteracting the spontaneous overheating, including dilu., will counteract production of CH_4. The similarity of the product distribution curves of hydrogenolysis of high hydrocarbons, and of synthesis from CO + H_2, with both curves showing a max. at a certain C chain length, cannot be invoked as evidence in favor of the polymerization-depolymerization equil. theory, as the max. lies at C_6 in the case of the synthesis, and at C_3-C_4 in the case of the hydrogenolysis, which is incompatible with an equil. N. Thon

CA

Catalytic hydrocondensation of carbon monoxide with olefins. VI. Hydrocondensation of carbon monoxide with normal butylene. Ya. T. Eidus, N. I. Krehov, M. I. Batuev, and N. D. Zelinskii (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1951, 723–7; cf. *C.A.* 41, 3741h; 43, 1064i; 45, 1497f, 8437d.—An equimol. mixt. of H_2 and C_4H_8, with 4–6% CO, passed at 180° under ohm. pressure over the catalyst at a space velocity of 80–125 l./l. catalyst/hr., formed 635.8 ml./cu.m., or 56 ml./l. catalyst/hr. of liquid condensate. Examples of balances are: With the initial gas composed of C_4H_8 37.0, H_2 46.6, CO 6.1, N_2 10.3 vol.-%, the outgoing gas was C_4H_8 3.2, H_2 35.4, CO 0.0, C_nH_m 34.0, N_2 24.0 vol.-%; reacted (in % of the amt. of original component) C_4H_8 97.1, H_2 74.2, CO 100%; C_nH_m formed (in % of the component reacted) from H_2 33.4, C_4H_8 32.2. Initial gas 42.7, 47.5, 2.6, 7.1, outgoing gas 40.0, 4.8, 0.0, 36.6, 18.4, reacted 70.4, 96.9, 100, C_nH_m formed 25.1, 38.5%. An example of the compn. of the liquid (with 4.0 vol.-% CO, 102 l./l. catalyst/hr., 20 hrs.) is, total oil 511.0 ml./cu.m. (of which heavy oil 180.1, light oil 331.8), H_2O 22.4, yield of total oil 47.3 ml./l. catalyst/hr. The condensate, freed from gas oil (C_6), b. between 28 and 276°, consists of aliphatic hydrocarbons, and contains about 28% of unsatd. compds. After hydrogenation, 77.5% of the liquid condensate b. between 28 and 152°; it consists of about 24% C_5 fraction (half of it isopentane), 15% C_6, 8% C_7, 8% C_8, and 9% C_9.

N. Thon

EYDUS, YA. T.

USSR/Chemistry - Synthetic Fuels Nov/Dec 51

"Catalytic Hydrocondensation of Carbon Monoxide With Olefins. VI. Hydrocondensation of Carbon Monoxide With n-Butene," Ya. T. Eydus, N. I. Ershov, M. I. Batuyev, N. D. Zelinskiy, Inst Org Chem, Acad Sci USSR

"Iz Ak Nauk SSSR, Otdel Khim Nauk" No 6, pp 722-727

Continuing investigation of reaction discovered by them in 1946, authors studied hydrocondensation of CO with n-butene at 190° and 1 atm in the presence of 4-6% CO and equimolar quantities of n-butene and H_2. Yield of liquid condensate amounts to 635

197T7

USSR/Chemistry - Synthetic Fuels (Contd) Nov/Dec 51

ml/m^3 (or 55 ml/l per hr. 97% of n-butene react; 30-37% under formation of butane). The liquid condensate freed from gasol (C_4) boils in the range 28-276°. It consists of paraffin hydrocarbons and 28% unsatd compds. On hydrogenation 77.5% of the liquid condensate distills between 28-152°. The compn then is 24 vol-% C_5 (half of it isopentane), 15% C_6, 8% C_7, 8% C_8, 9% C_9.

EYDUS, YA. T.

USSR/Chemistry - Synthesis of Hydrocarbons — Jan/Feb 51

"Mechanism of the Synthesis of Hydrocarbons From Carbon Monoxide and Hydrogen," Ya. T. Eydus, Moscow

"Uspekh Khim" Vol XX, No 1, pp 54-70

Discussion of mechanisms of reactions for synthesis
of hydrocarbons from H_2 and CO, based largely on
non-Russian work (with the exception of research by
Eydus, N. D. Zelinskiy, et al) covering developments
after 1940 (when Eydus published previous review of
subject), and supplementing a 1950 report by him

193T7

USSR/Chemistry - Synthesis of Hydrocarbons (Contd) — Jan/Feb 51

devoted to new types of reactions and catalysts. Deals at length with the problem of formation of CH_2 radicals.

193T7

USSR/Chemistry - Organometallic Compounds

Sep/Oct 51

"Review of S. T. Ioffe and A. N. Nesmeyanov's 'Handbook of Magnesium-Organic Compounds,' I-III," Ya. T. Eydus

"Uspekh Khim" Vol XX, No. 5, pp 671, 672

Reviews in some detail this work, which is a part of the series "Synthetic Methods in the Field of Organometallic Compounds" published under the general editorial supervision of Acad A. N. Nesmeyanov and K. A. Kocheshkov, Corr Mem, Acad Sci USSR. States that all references to reactions involving Mg-org compds and listed in "Chem Zentralblatt," 1899 - 1940, and "Chem Abstracts," 1941 - Jan 1, 1948, as well as Russian and USSR work in this fld not listed by these 2 journals (altogether more than 13,000 reactions) have been included in the handbook. According to Eydus, the handbook is well published and indexed. Published by Press Acad Sci USSR, M-L, 1950.

191T14

EYDUS, Ya.

USSR.

Tautomerism and isomerism of 2-nitro-1,3-indandione. G. Vanags, Ya. Eidus, and S. Giller. *Doklady Akad. Nauk S.S.S.R.* 79, 977-80(1951).—The structure of 2-nitro-1,3-indandione was studied by investigating the ultraviolet absorption spectrum of this compd. and its derivs. in H_2O, EtOH, 0.1 *N* H_2SO_4, ether, and dioxane. The spectra of the chloro-, bromo-, and iodo-2-nitro-1,3-indandione in ether were also studied. The spectra of the isomerization products were also used to det. their structure. The keto form exists in solvents having a large dielec. permeability. J. Rovtar Leach

NESMEYANOV, A.N., akademik, otvetstvennyy redaktor; BOBROV, P.A., doktor khimicheskikh nauk, otvetstvennyy redaktor; YELIZAROVA, A.N., kandidat khimicheskikh nauk, chlen redaktsionnoy kollegii; KAPLAN, Ye.P., kandidat khimicheskikh nauk, sekretar'; LIBERMAN, A.L., kandidat khimicheskikh nauk, chlen redaktsionnoy kollegii; NAGIBINA, T.D., kandidat khimicheskikh nauk, chlen redaktsionnoy kollegii; RUDENKO, V.A., kandidat khimicheskikh nauk, zamestitel' otvetstvennogo redaktora; ZYUS, Ya.T., doktor khimicheskikh nauk, chlen redaktsionnoy kollegii.

[Syntheses of organic compounds] Sintezy organicheskikh khimii. Moskva, Izd-vo Akademii nauk SSSR. Vol.2. 1952. 190 p. (MLRA 6:5)

1. Akademiya nauk SSSR, Institut organicheskoy khimii. (Chemistry, Organic)

EYDUS, YA. T.

USSR/Chemistry - Hydrocondensation — Jan/Feb 52

"The Catalytic Hydrocondensation of Carbon Monoxide With Olefins. VII: Effect of the Concentration of Carbon Monoxide on Its Hydrocondensation With Propene and n-Butene," Ya. T. Eydus, N. D. Zelinskiy, K. V. Puzitskiy, N. I. Yershov, Inst of Org Chem, Acad Sci USSR

"Iz Ak Nauk, Otdel Khim Nauk" No 1, 1952, pp 145-151

Hydrocondensation of propene-hydrogen and butene-hydrogen mixts does not occur in absence of CO. Reaction rate of hydrocondensation of propene and

208T11

USSR/Chemistry - Hydrocondensation (Contd) — Jan/Feb 52

butene is highest with 6-8% CO in the original gas mixt. If the original mixt contains 15-20% CO, hydrocondensation with propene and butene is sharply retarded, as distinguished from the same process carried out with ethylene.

208T11

EYDUS, Ya.T.; PUZITSKIY, K.V.; BATUYEV, M.I.

Catalytic hydrocondensation of carbon monoxide with olefins. VIII. Hydrocondensation of carbon monoxide with isobutylene. Izvest. Akad. Nauk S.S.S.R. Otdel Khim. Nauk '52, 978-81. (MLRA 5:11)
(CA 47 no.21:11122 '53)

1. Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow.

EYDUS, Ya. T.

Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
Organic Chemistry

Catalytic hydrocondensation of carbon monoxide with olefins. IX. Reactions of methyl and ethyl alcohol with ethylene. Ya. T. Eidus and L. V. Guseva (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1952, 1075–81; cf. *C.A.* 46, 11098h; 11122h.—Since mixts. of C_2H_4 with H_2 and CO condense, it was expected that compds. able to decomp. into CO and H_2 would also enter a condensation reaction with olefins on the same catalysts. The expected reaction scheme, involving intermediate CH_2 radicals, for MeOH is, MeOH + CH_2:CH_2 → (CO + 2 H_2 + CH_2:CH_2) → (CH_2 + H_2O + CH_2:CH_2) → MeCH:CH_2 + H_2O; MeOH + MeCH:CH_2 → (CO + 2 H_2 + MeCH:CH_2) → (CH_2 + H_2O + MeCH:CH_2) → $MeCH_2CH$:CH_2 + H_2O, etc. Similarly, with EtOH, one can expect a build-up of higher hydrocarbons according to the scheme EtOH + CH_2:CH_2 + H_2 → (CO + 2H_2 + CH_2:CH_2 + CH_2) → (CH_2 + H_2O + CH_2:CH_2 + CH_2) → MeCH:CH_2 + H_2O + CH_2; MeCH:CH_2 + EtOH + H_2 → (CO + 2 H_2 + MeCH:CH_2 + CH_2) → EtCH:CH_2 + (CH_2 + H_2O + MeCH:CH_2 + CH_2) → C_3H_6 + H were bubbled through liquid MeOH or EtOH and so charged with known amts. of alc. vapor, and passed, at 200°, over catalysts, partly fresh and partly having served previously in hydrocondensation of C_2H_4 + H + CO. For example (with MeOH counted as CO + $2H_2$) 47.6 vol.-% C_2H_4, 40.7 vol.-% H, and 5.7 vol.-% CO at a space velocity of 81; yields 4.0% C_3H_6, 26.5% H, 3.1% CO, and 66.4 vol.-% C_3H_6; % reacted, 97.2 C_2H_4, 81.3 H, 81.8 CO; liquid space velocity for MeOH, 0.01; C_3H_6 produced in % of C_2H_4 reacted, 47.6; wt.-% MeOH reacted, 77.6. In this run, the yield of heavy oil was 7.9 ml./cu. m., light oil 122.8 ml./cu. m., gas oil (C_5–C_6) 154.6 ml./cu. m.; total yield of oil, 285.3 ml./cu. m. (23.2 ml./l. hr.); mole ratio MeOH:H_2:C_3H_4 reacted, 1:3.2:5.2. The CO present in the final

(OVER)

product corresponds to that part of MeOH which was decompd. without entering condensation. The fractions of C_2H_4 or H consumed in the hydrocondensation are obtained by deducting the amts. corresponding to production of C_2H_6 from the total amts. reacted. The percentage of MeOH reacted varied from 60 to 90%; from 68 to 100% of it enters the hydrocondensation, and 32–0% appears as CO. The percentage of C_2H_4 reacted varied from 69 to 99.5%, of which, depending on conditions, from 22 to 65% is hydrogenated to C_2H_6. The mole ratio MeOH:H_2:C_2H_4 reacted, roughly 1:3:5, is close to the mole ratio CO:H_2:-C_2H_4 reacted in condensation CO + H_2 + C_2H_4. The yields of condensate are also close, and so are the properties of the oil fractions; an example is, fraction b. below 150°, yield 67.2 vol.-%, unsatd. hydrocarbons 67%; b. 150–220°, 15.5, 48; residue 17.3. An example of a run with C_2H_4 + H_2 + EtOH, at 200°, is: calcd. compn., C_2H_4 24.8, H_2 46.0, CO 14.6, CH_4 14.6, vol.-% space velocity 183; compn. of final gas, C_2H_4 2.0, H_2 37.9, CO 2.2, C_nH_{2n+2} 57.9%; % reacted, C_2H_4 97.3, H_2 72.5, CO 93.7; liquid space velocity for EtOH, 0.11; C_2H_6 produced, in % of C_2H_4 reacted, 18.2; wt.-% EtOH reacted 72.6; yield of heavy oil 11.7, light oil 87.4, gas oil 128.1 ml./cu. m., total oil 227.2 ml./cu. m. (36.4 ml./l. hr.). The fraction of EtOH reacted, depending on its space velocity, 0.04–0.11, varied from 58.3 to 72.6%, of which 86–97% enters hydrocondensation with C_2H_4 and only 3–12% appears as CO. The percentage of C_2H_4 reacted is 90–0%, of which 18–57% is hydrogenated to C_2H_6. In the liquid condensate, the fraction b. below 160° (60 vol.-%) contains 26% unsatd. compds.; b. 160–210° (11.6), 20; residue 4.2%. The 1st fraction contains a small amt. of org. O compds.

N. Thon

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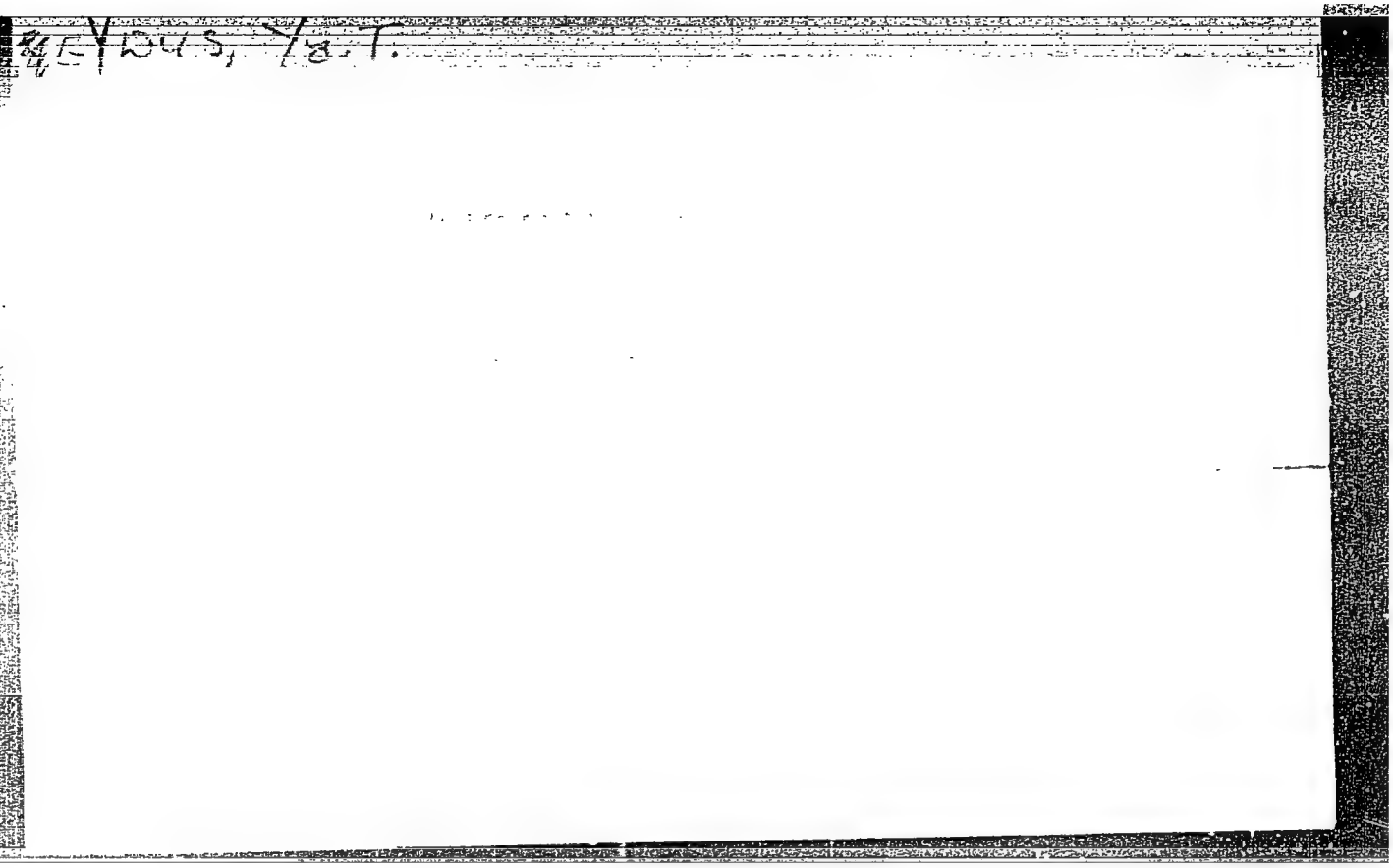


1. EYDUS, Ya.T.

2. USSR (600)

4. Fuel

7. Synthesis of motor fuel from carbon monoxide. Priroda. 41, no. 10, 1952.

9. Monthly List of Russian Accessions, Library of Congress, February 1953. Unclassified.

EYDUS, YA. T.

USSR/Chemistry - Aromatic Hydrocarbons 21 Nov 52

"Methylation of Cyclohexene With the Methylene Radical," Ya. T. Eydus and N. I. Yershov, Inst of Organic Chem, Acad Sci USSR

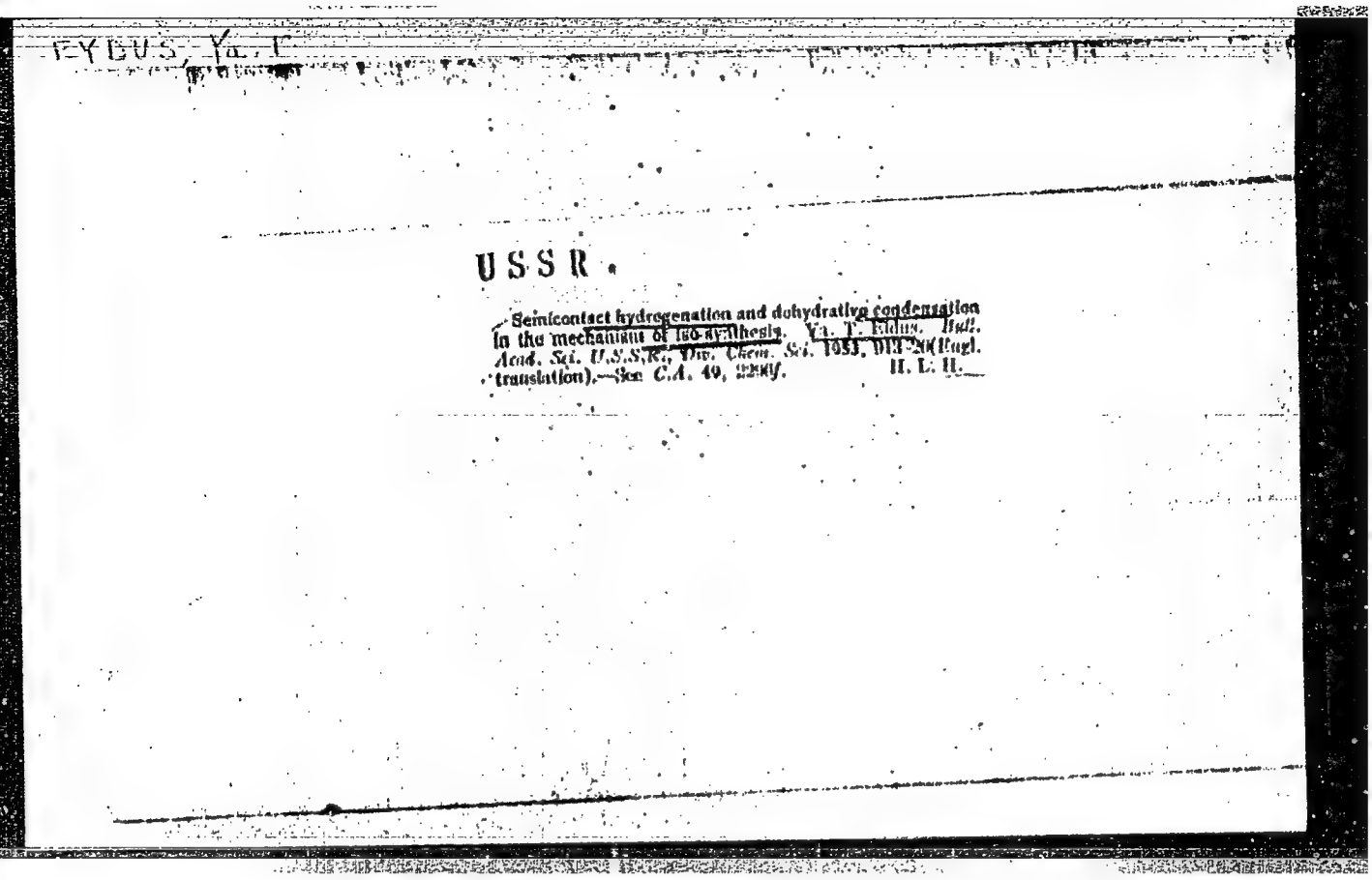
"Dok Ak Nauk SSSR" Vol 87, No 3, pp 433-436

The catalytic hydrocondensation of cyclohexene and carbon monoxide is studied. It was found that methylation due to the action of H_2 + CO occurs in the 1 and 2 positions of cyclohexene. Presented by Acad B. A. Kazanskiy 19 Sep 52.

245T13

EYDUS, Ya. T.

Catalytic hydrocondensation of carbon monoxide with olefins. X. The behavior of cyclohexene in hydrocondensation catalysis. Ya. T. Eidus and N. I. Reshov (Inst. Org. Chem. Acad. Sci. U.S.S.R., Moscow). *Izvest. Akad. Nauk S.S.S.R., Otdel. Khim. Nauk* 1953, 704–12; cf. *C.A.* 48, 5071c.—In the hydrocondensation of cyclohexene with CO and H in the presence of C_5H_5, there take place reactions of irreversible catalysis, with formation of C_5H_5 and cyclohexene, along with hydrogenation to cyclohexane and methylation, which yields methyl- and 1,2-dimethyl-substituted cyclohexenes. In expts. without C_5H_5, the main mass of the products consists of methylated 6-membered rings, such as methyl- and 1,3-dimethylcyclohexenes; apparently no 1,3- and 1,4-di-Me derivs. formed. G. M. Kosolapoff



FEYGUS, Ya. T.

USSR

Semicontact hydrogenation and dehydrating condensation in the mechanism of iso-synthesis. Ya. T. Eidus. *Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.* 1953, 201-20(Engl. translation).—See *C.A.* 49, 2289f. H. L. H.

EYDUS, YA T.

USSR/Chemistry - Hydrocarbon Synthesis, Catalysts Nov/Dec 53

"Semi-Catalytic Hydrogenation and Dehydrating Condensation in the Isosynthesis Reaction Scheme," Ya. T. Eydus, Inst Org Chem, Acad Sci USSR

Iz Ak Nauk SSSR, OKhN, No 6, pp 1024-1034

In the synthesis of hydrocarbons from CO and H_2 on non-hydrogenating oxide catalysts (Al_2O_3, ThO_2), i.e. in isosynthesis, the mols of CO are activated on the surface of the catalyst and remain attached to that surface, while the mols of H_2 are activated thermally and react from th gas vol without

273T11

becoming attached to the catalyst. CHOH groups participate together with CH_2 in the formation of hydrocarbon chains in this synthesis. Iso-compds are then formed by catalytic condensation under elimination of water.

1. KAZANSKIY, B.A.; EIDUS, YA.T.

2. USSR (600)

4. Hydrocarbons

7. "Chemical utilization of petroleum hydrocarbon gases." A.S. Nekrasov, B.A. Krentsel', Reviewed by B.A. Kazanskiy, YA. T. Eidus, Usp.khim. 22 no. 4, 1953.

9. Monthly List of Russian Accessions, Library of Congress, APRIL 1953, Uncl.

EIDUS, YA. T.

USSR/Chemistry - Fuels Jul 53

"Polymerization and Other Transformations of Ethylene and Propylene Under the Action of Heat, Free Radicals, and Other Active Particles," Ya.T. Eidus and K.V. Puzitskiy (Moscow)

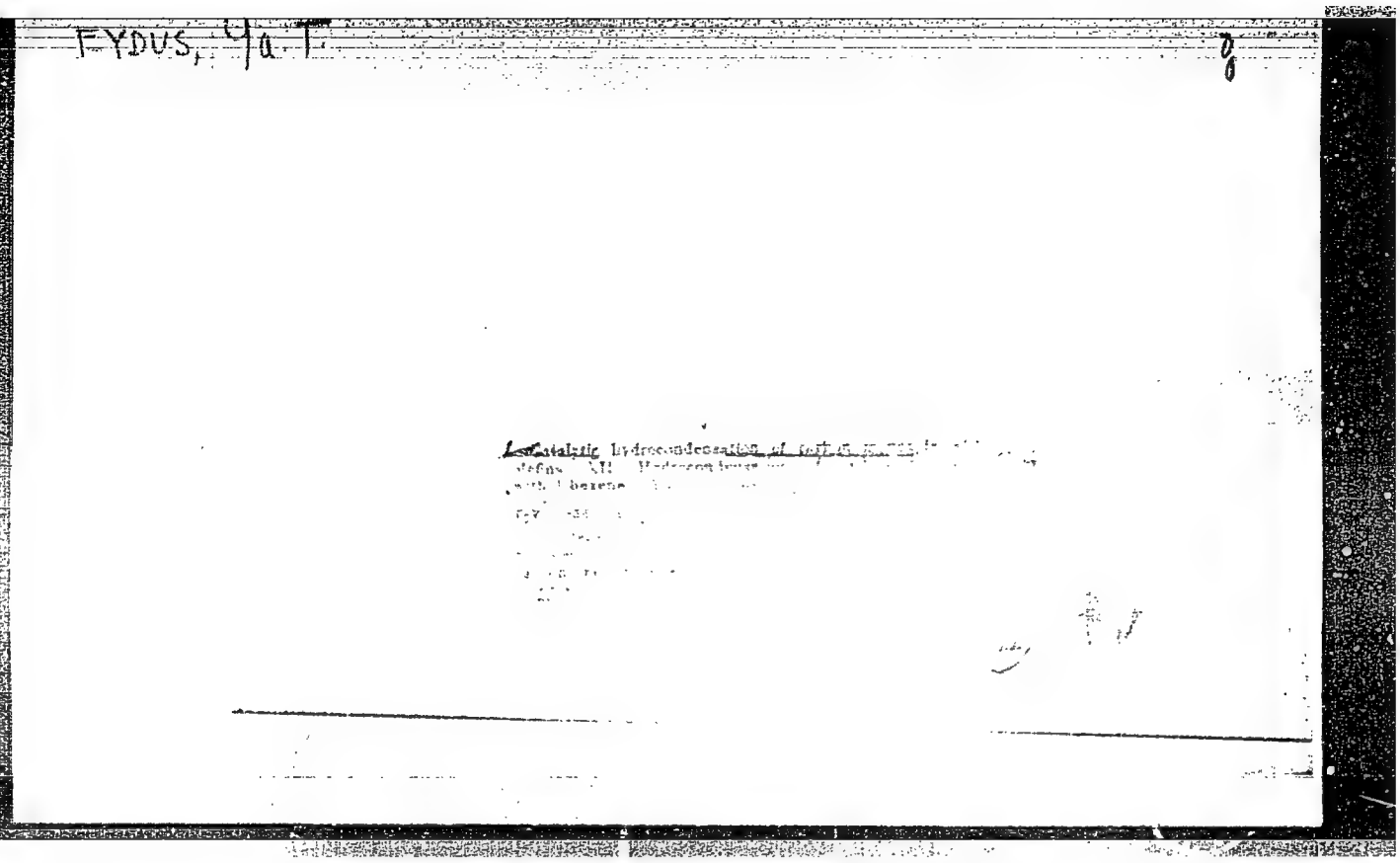
Zhur Prik Khim, Vol 22, No 7, pp 838-877

Discusses the thermal polymerization of ethylene (I) and propylene (II) under pressures both below and above atm. Goes on to discuss the polymerization of I and II under the action of photons, exited metal atoms, free atoms, and radicals. Also discusses the polymerization of I and II in

273T29

electrical discharge fields (electropolymerization). Bibliography consists of 204 references of which 25 are Russian and the remainder of western origin.

273T29



[redacted]; PUZITSKIY, K.V.; GUSEVA, I.V.

Catalytic condensation of carbon monoxide with olefins. Report no.13. Effect of the ethylene-hydrogen relation in the initial gas, of nitrogen dilution, and of volume velocity on the hydrocondensation of carbon monoxide with ethylene. Izv.AN SSSR Otd. khim.nauk no.5:890-897 S-O '54. (MLRA 8:3)

1. Institut organicheskoy khimii im. N.D.Zelinskogo Akademii nauk SSSR.
(Condensation products (Chemistry)) (Carbon monoxide) (Ethylene)

EYDUS, Ya. T.

AID P - 1311

Subject : USSR/Chemistry

Card 1/1 Pub. 119 - 5/5

Authors : Eydus, Ya. T. and Puzitskiy, K. V. (Moscow)

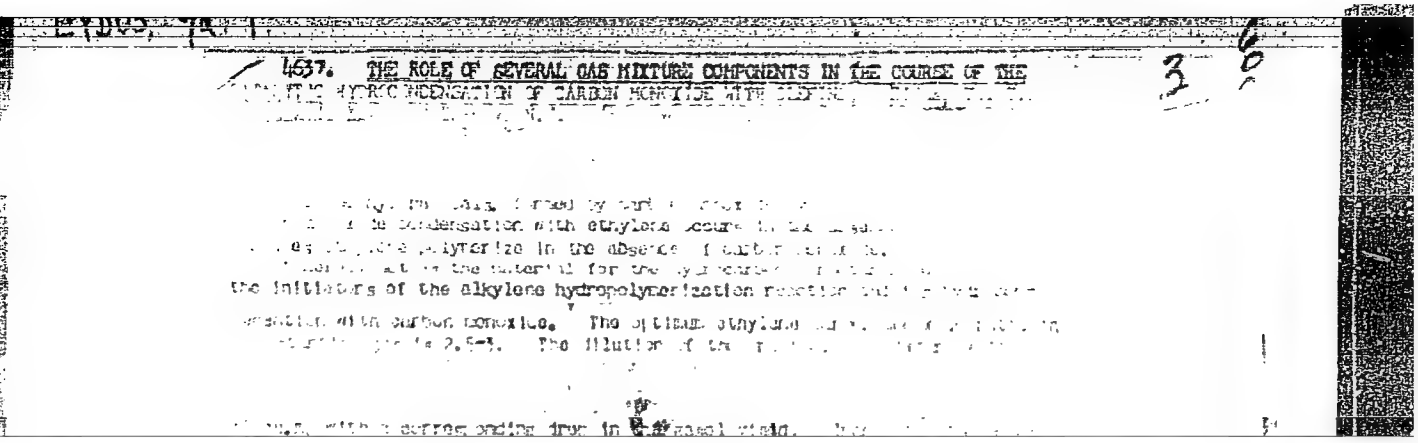
Title : Catalytic polymerization of ethylene and propylene

Periodical : Usp. khim., 23, no. 8, 986-1026, 1954

Abstract : The catalytic effect of mineral acids, metallic halides and of heterogeneous catalysts on the polymerization of ethylene and propylene is covered. 220 references (32 Russian: 1873-1951).

Institution : None

Submitted : No date



4637. THE ROLE OF SEVERAL GAS MIXTURE COMPONENTS IN THE COURSE OF THE
HYDROGENATION OF CARBON MONOXIDE WITH

condensation with ethylene occurs in
polymerize in the absence
the initiators of the alkylene hydropolymerization
with carbon monoxide. The
2.5-1. The dilution of the
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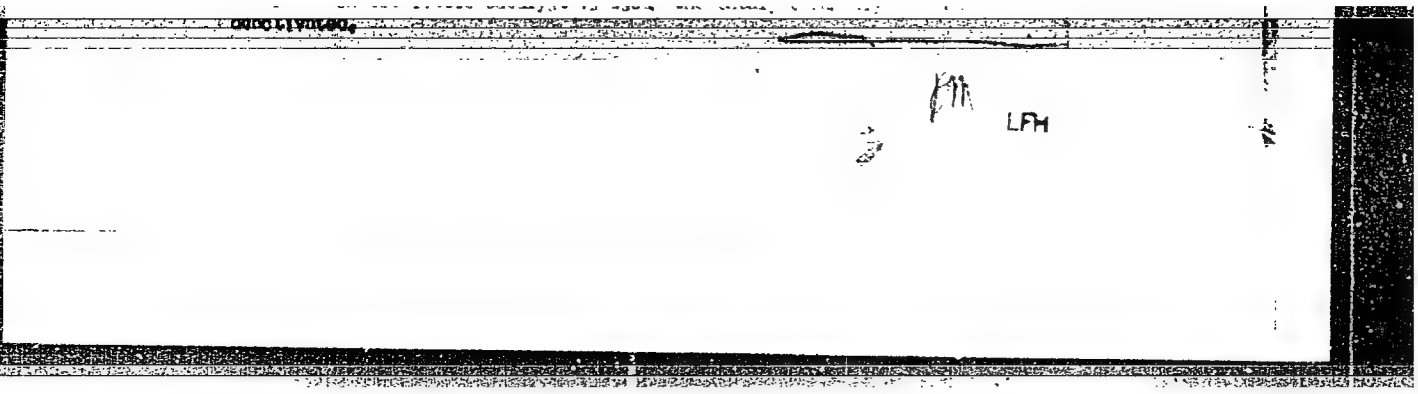

APPROVED FOR RELEASE: Thursday, July 27, 2000 CIA-RDP86-00513R00041231(

EYDUS, Ya.T.

USSR

Catalytic hydrocondensation of carbon monoxide with olefins. XI. Behavior of trimethylethylene and tetramethylethylene in hydrocondensation catalysis. Ya. T. Eidus, K. V. Puzitskii, and A. P. [illegible] (Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Izv. Akad. Nauk S.S.S.R., Otd. Khim. Nauk* 1954, 140-50; *Bull. Acad. Sci. U.S.S.R., Div. Chem. Sci.* 1954, 123 (English translation); cf. *C.A.* 49, 4540h.—A study of hydrocondensation of CO with $Me_2C{:}CHMe$ and $Me_2C{:}CMe_2$ showed that $Me_2C{:}CHMe$ enters hydrocondensation only to the extent of 5-6% while 30-5% is hydrogenated to isopentane; $Me_2C{:}CMe_2$ enters hydrocondensation with CO to the extent of 10%, while 50% is hydrogenated to 2,3-dimethylbutane. The hydrocondensation products were not identified. Dehydration of iso-AmOH over Al_2O_3 at 450-500° gave mixed iso-$Pr^1CH{:}CH_2$, $Me_2C{:}CHMe$ and $MeEtC{:}CH_2$; the mixt. was treated with dil. H_2SO_4 with ice cooling, and the aq. layer sepd. and dild., yielding 45% $Me_2C{:}CHMe$, b_{760} 37-8°, d_0 0.6560, n_D^{20} 1.3880. Me_2CAc was hydrogenated over 30% Ni catalyst (cf. Bag, *et al.*, *C.A.* 28, 2958[1]) at 80-100 atm. H and 160-80°; the resulting $Me_2CCH(OH)Me$, b_{760} 118-20°, dehydrated over $Al_2(SO_4)_3$ 27 hrs. at 275° gave, after extensive fractionation, $Me_2C{:}CMe_2$, b. 71-3°, d_0 0.7075, n_D^{20} 1.4128. G. M. K.

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EYDUS, Ya. T.

USSR

Catalytic hydrocondensation of carbon monoxide with olefines. XII. Hydrocondensation of carbon monoxide with hex-1-ene.

Ya. T. Eidus, N. F. Yershov, and Ye. M. Terent'eva. XIII. Effects of varying the ratio of ethylene to hydrogen in the initial gas, of dilution with nitrogen, and of varying the rate of flow on hydrocondensation of carbon monoxide with ethylene. Ya. T. Eidus, K. V. Puzitskii, and I. V. Guseva (*Izvestia Akad. Nauk SSSR, Otdel. Khim. Nauk*, 1954, 882—889, 890—897).—XII. The main product obtained when 1 : 3 hex-1-ene–H_2 mixtures are passed over an unspecified catalyst at 190° is n-C_6H_{14} (71% yield), with about 9% of higher b.p. hydrocarbons (C_7 or more). Mixtures containing hex-1-ene 58—61, CO 4·6—7, and H_2 34—38% give 38—40% yields of higher hydrocarbons, and only 35—36% yields of n-C_6H_{14}.

XIII. The highest yields of oils from C_2H_4–CO–H_2 mixtures containing 3—6% of CO are obtained with 3 vol. of C_2H_4 to 1 vol. of H_2; the content of unsaturated hydrocarbons in the gasoline fraction rises steeply as the C_2H_4 : H_2 ratio rises from 1 to 3. The overall yield of oils falls with increasing dilution with N_2 from 4·6 to 71%; the yield of heavy oil is const. over this range, of light oil rises, and of gasoline falls, as the N_2 content rises from 5 to 55%. The yields calculated as ml. of oil per cu. m. of gas are unaffected, and calculated as ml./l./hr. rise linearly when the rate of flow of the gas is increased.

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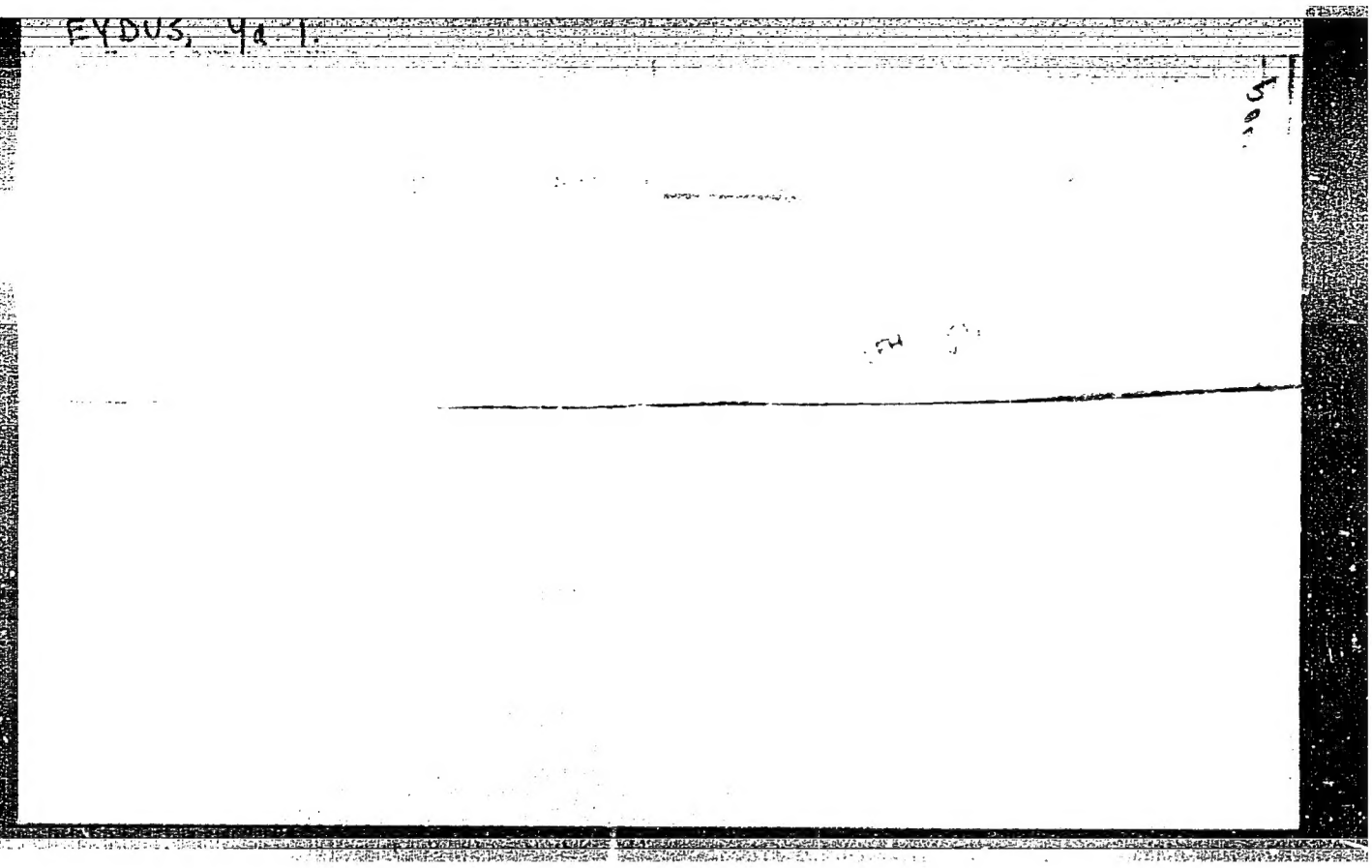
Mechanism of semicontact hydrogenation of carbon monoxide under pressure. Ya. T. Eidus (N. D. Zelinskii Inst. Org. Chem., Acad. Sci. U.S.S.R., Moscow). *Kataliticheskoe Gidrirovanie i Okislenie, Akad. Nauk Kazakh. S.S.R. Trudy Konf.* 1955, 27–37.—The so-called semicontact hydrogenation of CO, or "isosynthesis" (cf. Pichler, *et al.*, *C.A.* 44, 815c) is discussed in respect to its probable mechanism. By assuming the semicontact hydrogenation step, i.e., a step in which H_2 rather than 2H react, the formation of MeOH and $MeCH(OH)CH_2OH$ is readily explainable. The catalysts used in this synthesis have high dehydration ability, on the basis of which the complete mechanism of isosynthesis involves the above semicontact hydrogenation and dehydrative condensation to yield the isostructures of final hydrocarbons. G. M. Kosolapoff



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USSR/Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis B-9

Abs Jour : Referat Zhur - Khimiya, No 3, 1957, 3867

Author : Eydus Ya.T., Izmaylov N.T.
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Title : Catalytic Hydro-Condensation of Carbon Monoxide with Olefins. Communication 14. Mutual Transformation of Butene-1 and Butene-2 Under Conditions of Catalytic Hydro-Condensation of Carbon Monoxide with Olefins. Communication 15. Hydro-Condensation of Carbon Monoxide with Butene-2.

Orig Pub : Izv. AN SSSR, Otd. khim. n., 1955, No 4, 467-474, 475-481

Abstract : 14. Investigation of the reaction of isomerization of butene-1 (I) to butene-2 (II) and of II to I, at 190° and space velocity 66-100 hour^{-1}, over catalysts of the reaction of hydro-condensation of CO with olefins. It is shown that in the absence of H_2 the reactions I → II and

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II → I are practically not taking place, in the presence of 10% H_2 the I:II ratio in the products of the reaction I → II is of 1:1.1 The reaction II → I is practically not taking place even in the presence of 22.6% H_2. Hydrogenation of olefins in the experiments with I occurs ~2 times more rapidly than with II under analogous conditions.

15. The reaction of hydro-condensation of CO with II was investigated in a flow system at 190° and p = 1 atmosphere, in a glass tube. It was found that the reaction products contain essentially hydrocarbons of a normal structure admixed with hydrocarbons with a lateral CH_3- group at the second atom of the carbon chain. From this the authors draw the conclusion that II, as such, reacts only to a slight extent, but undergoes catalytic isomerization to I, which remains in its entirety

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/Catalytic hydrocondensation of carbon monoxide with olefins. XVI. Hydrocondensation of carbon monoxide with [illegible] Ya. T. Eidus and R. I. Izmailov (*Izv. Akad. Nauk SSSR, Otd. Khim. Nauk*, 1958, 723—729).—Catalytic condensation of CO, but-1-ene and H_2 at 190° and atm. pressure is discussed, with and without addition of 10—30% of but-2-ene. With a gas mixture of 70—75 of but-1-ene, 20—25 of H_2 and 4—6% of CO, liquid condensate yield averaged 100 ml./l./hr. 74·4% of but-1-ene reacted, 9·4% hydrogenating into butane and ~15% isomerizing into but-2-ene. The liquid condensates, freed from C_4 fractions and isopentene, contained <52% of unsaturated hydrocarbons. In same conditions, with up to 25% of but-2-ene in gas mixture, no difference was noted in yield of liquid condensates. Reaction products after hydrogenation were mainly saturated hydrocarbons of normal structure and contained insignificant amounts of hydrocarbons with one methyl side-group on the second atom of the hydrocarbon chain. A. L. B.